THROUGH ROUTES FOR CHICAGO'S STEAM RAILROADS

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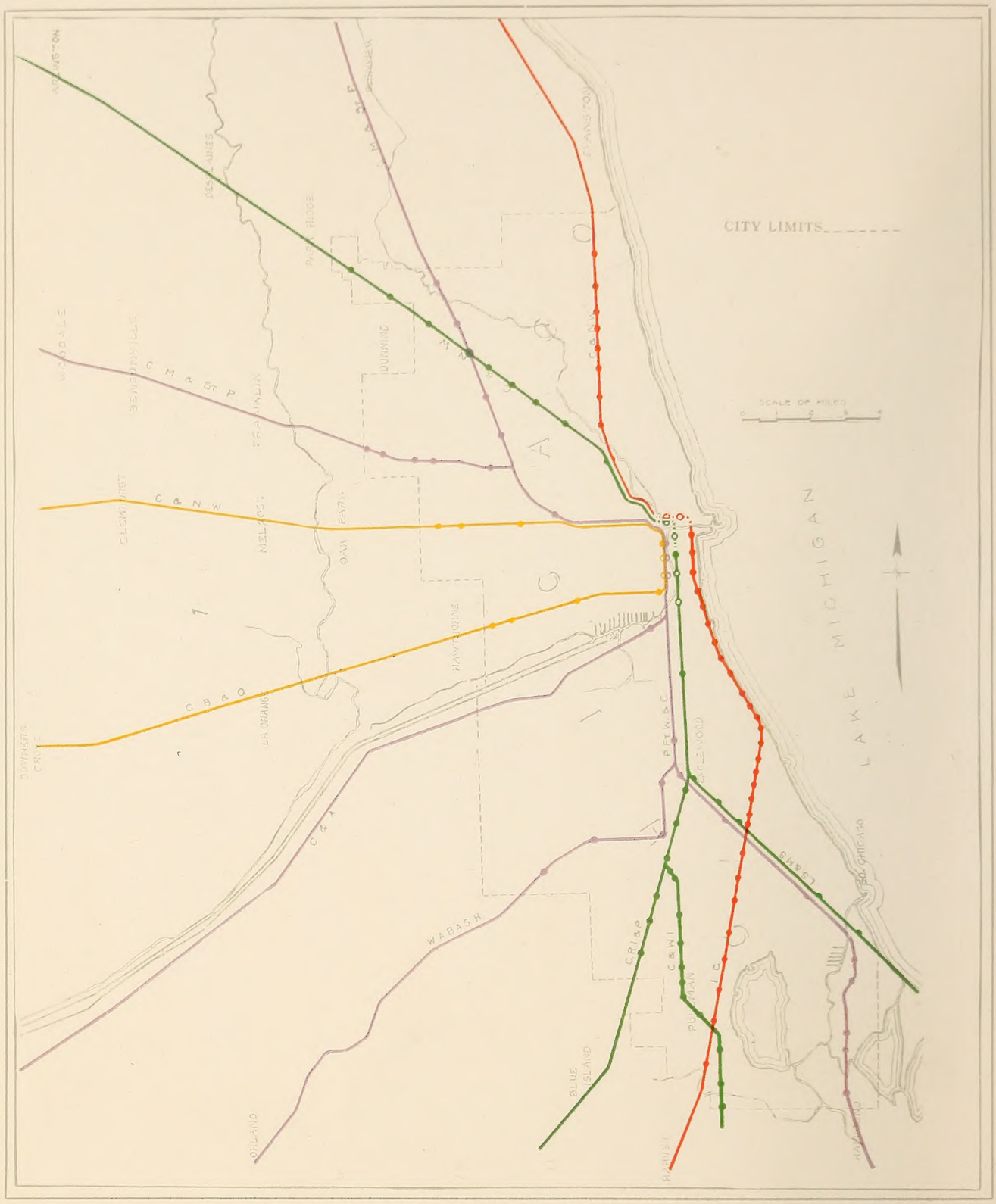


Frontispiece: MAP OF CHICAGO AND VICINITY SHOWING TENTATIVE PLAN FOR SYSTEM OF THROUGH ROUTES FOR LOCAL PASSENGER SERVICE ON THE STEAM RAILROADS.

This plan was presented by Mr. Bion J. Arnold before the City Council Committee on Railway Terminals, in March, 1914, not as a definite scheme worked out in detail, but as a preliminary study to show the possibility of applying the through-routing principle to the steam lines of Chicago for local passenger service for city and suburbs.

The plan shows four through routes, or through-route systems, each represented by a separate color and formed by connecting existing steam railroads down town.

Solid lines indicate existing steam railroads; *dotted lines* indicate proposed downtown subway connections; small *solid circles* (or semi-circles) indicate existing stations within the city limits; small *open circles* (or semi-circles) indicate proposed new downtown stations. Each route has three or more downtown stations. (For further description, see *pages* 78 and 82.)

THROUGH ROUTES FOR CHICAGO'S STEAM RAILROADS

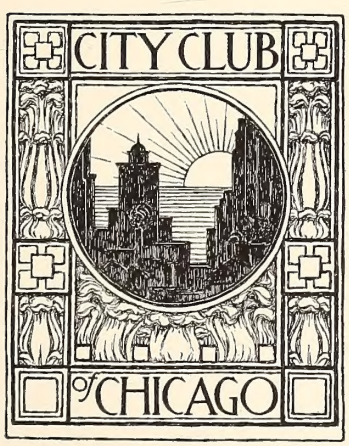
THE BEST MEANS FOR ATTAINING POPULAR AND COMFORTABLE TRAVEL FOR CHICAGO AND SUBURBS

BY

GEORGE ELLSWORTH HOOKER

CIVIC SECRETARY OF THE CITY CLUB OF CHICAGO;
SECRETARY OF THE SPECIAL STREET RAILWAY COMMITTEE,
CITY COUNCIL OF CHICAGO, 1897-8.

ILLUSTRATED



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1914

FOREWORD

THIS book presents two propositions. The first is that Chicago's urgent need for better means of fast and comfortable local travel should be largely met by its steam lines; the second is that these should, to that end, be organized on the through-route plan.

The steam lines are mostly elevated already above street interference, they represent the highest speed in travel, they fan out thickly over the city, they have their own rights-of-way and so minimize public suffering from the noise, dust and danger incident to fast travel, and they have a wide margin of unused capacity.

The through-route idea, making as it does for normal city development and for the spread of population, is beginning to be recognized as the basic principle of city planning for large communities. Its application to local travel routes is indispensable to sound and far-sighted city planning for Chicago. The idea is indeed accepted in practice now for all local passenger railways in Chicago except the steam lines—which still operate entirely on the terminal plan.

It is believed that a properly designed and operated system of through routes for local travel on the steam lines would constitute, from a broad city planning standpoint, the most efficient trunk factor for a logical trunk-and-feeder scheme of passenger travel for the entire city and its suburbs, and would yield more accommodation in rapid transit for the same outlay than could be secured in any other way.

Such fitness as the author may have for discussing this subject comes from the investigations made by him as secretary of the Special Street Railway Committee of the City Council of Chicago in 1897-8, and from personal study before and especially since then of passenger traffic and housing conditions in American and foreign cities. The opinions here expressed were first outlined by the author in the series of transportation discussions held by the City Club last year, and, so far as known to him, constitute the first advocacy of the idea that the steam railroads of Chicago ought to serve in a large way for local travel.

Thanks are due to Mr. Charles K. Mohler, formerly of Chicago, now Chief Engineer of the Board of Public Utilities of Los Angeles, for several original maps and other valuable data here reproduced. Acknowledgment for maps and diagrams used is also due to Mr. Richard Petersen, Dr. Rudolf Eberstadt and Professor Bruno Möhring of Berlin, the Citizens' Terminal Plan Committee of Chicago, the Chicago Plan Commission, the Board of Supervising Engineers—Chicago Traction, the Chicago Association of Commerce Committee on Smoke Abatement and Electrification, Mr. Bion J. Arnold, Mr. Frederic A. Delano, Mr. William Drummond and Mr. Jarvis Hunt.

Mr. Dwight L. Akers, Assistant Civic Secretary of the City Club, rendered special assistance in the final revision of the text.

Mr. Carlos Colton Daughaday as editor in charge has directed the work of publication.

June, 1914. *G. E. H.*

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THE ARGUMENT IN OUTLINE.

URS is, for its number of people, the most spread-out community in the world. More than any other, therefore, it needs means of rapid and comfortable passenger travel both within and without the city limits. In actual fact, however, Chicago does not travel either rapidly or comfortably.

The following figures have been secured from reliable sources as to the number of local railway passengers per year in Chicago and the approximate speeds at which they travel—the average speeds for the "Elevated" and steam lines being obtained by combining their respective local and express schedules.

Street railway passengers (excluding transfers).....600,000,000, average speed— 9 miles per hour
"Elevated" railway passengers.....164,000,000, average speed—14 miles per hour
Steam railway passengers (approximately)..... 41,500,000, average speed—24 miles per hour

The street cars of Chicago, if operated at a speed appropriate for long hauls, become dangerous, deluge people with dust and deafen them with noise—in short, become inappropriate for the public streets. The elevated electric lines are faster than the street railways, but are slower and ramify less widely than the steam lines. For a considerable fraction of the 600 million street railway passengers and the 164 million elevated railway passengers the crowding is nothing less than a disgrace to the community. A very great number of those passengers also suffer a constant and enormous waste of time—as compared with steam travel—by using those facilities for long haul journeys.

Steam travel too limited.

It is, therefore, the steam railroads of Chicago—presumably soon to be electrified*—which alone represent the speed and comfort appropriate for the long journeys so characteristic of the local travel of this diffused community. Yet only 1/20th of all the local passengers in Chicago enjoy that standard of travel. Despite the steady and rapid increase of the population of the city, and despite the fact that the number of street railway passengers has doubled within the last eleven years, the steam lines are not greatly increasing their *local passenger service,* and have not been doing so for years; nor do their managers promise any important future increase. The steam railways in Greater Berlin—which include a great east and west four-track through route—carry eight times as many local passengers as do those in Greater Chicago.

It is the meagerness of local high speed travel by rail which in part at least explains the thousands of automobiles parked daily in the downtown streets. The space demands per passenger, however, of the automobile, whether moving or standing, are so great that no policy would be justified which would compel or even permit it to become a general means of travel

*In applying the word "steam" herein to designate railways or railway routes now operated by steam, it is assumed that these will be converted to electrical or other smokeless operation in the reasonably near future.

to and from the ever-thickening business center. If it became such, all other vehicles would, from sheer lack of room for them, have to be put off the surface of the streets.

Nor will subways in the central district—facilitating increased speed for a short distance only—meet the case. Moreover, a subway system extending over the whole city, even if it reached the speed of the steam lines, would be enormously costly as compared to the expense of developing for local traffic, steam lines already existing, and would be open to the serious objections which attach permanently to underground travel. The steam lines should be more extensively utilized for fast travel.

Through steam routes required.

To secure such utilization of the steam lines, however, they must be linked up into through routes—continuous from one side of the city, through the business center or through other important centers or districts, to another side. Passengers using a given through steam route could then ride *without change* from any station on one side of the city to any station on another side, or —on the downtown routes—to any one of several stations which would presumably be established in the business district. Few would ride from one end of a through route to the other, but many would ride from one side of the city or of the business district to another side; and many would be convenienced by a choice between *several* different stations on each line in that district, where now they have but one.

With through routes thus operated, a logical system of surface feeder lines, crossing them at their various central, as well as outlying stations, could likewise be developed, so that a passenger starting at any point in the city or its environs could be certain of getting conveniently to or near his ultimate destination, and of having the maximum opportunity to use the highest speed service.

Thus, through steam routes, properly fed by the street railways, would actually give all parts of Greater Chicago rapid and convenient communication with each other. With few exceptions our characteristic long journeys could then be readily made in part or in whole on the swift and comfortable steam lines. With the exception, too, of such downtown sections of these lines as might possibly be placed in short subways, this high speed travel would be entirely above ground.

Through steam routes would conserve streets.

The stub-end steam terminal involves a great amount of excess trackage in its train shed and adjacent yard for reverse train movements and for cars waiting in the train shed longer than is necessary for loading and unloading. Its consequent great width necessitates correspondingly long subways or viaducts for the streets crossed. The through-route station need be perhaps only one-half or one-third as wide at street crossings as the stub-end terminal. By such stations, for example, the street subways under the new Northwestern and the Rock Island terminals might be shortened perhaps one-half or more. The cost of these terminals would also be correspondingly reduced.

Through steam routes would let the business center grow.

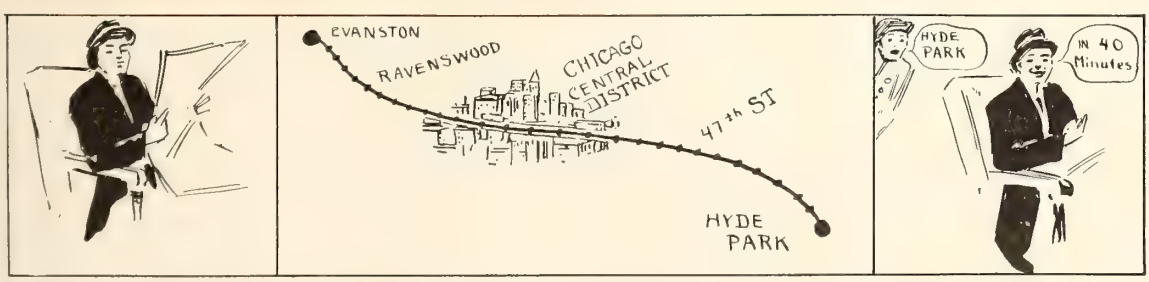
The establishment of through steam routes, each with several stations in the business district, would remove a powerful pressure against the natural growth of that district.

The great majority of the 100,000 passengers into, and then out of, the downtown steam terminals daily, are destined for points widely scattered throughout the business area. Yet no passenger, save on the Illinois Central suburban service, has any option as to the place of leaving or taking his train. Since most passengers, however, would be averse to spending an extra

EVANSTON TO HYDE PARK.

Via terminal routes—one hour and ten minutes.

Via through route—forty minutes.



A Pleasant 40 minutes on the through route

PLATE 1.

fare for street car or to spending more than ten or fifteen minutes walking between station and downtown destination, *terminal routing is always tending to limit the business district to an area every part of which can be reached from every steam terminal, by walking, within ten or fifteen minutes.*

The business district can never expand naturally until freed, not alone from the barricading effect of the surrounding steam railroad property, but also from the compression of the "Little Chicago" plan of steam railroad routing.

Through steam routes practicable in Chicago.

The through-route principle for urban transportation has been rapidly winning its way in modern cities respecting elevated and underground and, especially, street car lines. Chicago has adopted it for elevated and street railways. Despite peculiar difficulties, the principle has also been applied in a number of cities, and with conspicuous success, to steam lines. It is being applied to steam lines in several notable instances at the present time, and its application to steam lines has been officially recommended as the only satisfactory solution in other important instances.

Through routing on the steam lines of Chicago is recommended by Mr. Bion J. Arnold in his recent Chicago Railway Terminal Report, and he has suggested a tentative scheme of routes [see *frontispiece*], for carrying this out. This scheme would employ properties already existing and would involve only a limited additional investment. The desirability of through routes for local steam service in Chicago has also been approved by Mr. John F. Wallace, expert for the City Council Railway Terminals Committee.

Electrified as they presumably will be in due course, amplified where necessary by additional tracks alongside, linked up into through routes, and properly crossed at stations by surface feeder lines, the steam lines should constitute a trunk system of popular, safe, comfortable, sun-lit and *rapid* travel throughout Greater Chicago.

How shall this be accomplished?

A plan of procedure to this end should be worked out, and every railroad company now or hereafter seeking privileges from the City Council should be required, as a condition of receiving them, to join in that plan.

The Boston Metropolitan Improvements Commission has recommended that the different railroad companies of Boston should voluntarily turn over all their properties, on an appraised valuation, to a Terminal Company, which should hold, develop and administer these properties as a unit, and distribute the income to each owner pro rata.

Mr. Arnold has suggested for Chicago an expert board, which should require one railroad company after another—as they should, in seeking city privileges, come under its authority—to develop or administer its property in accordance with a harmonious plan to be devised by that board.

The State Public Utilities Commission of Illinois has broad powers of control, adequate perhaps for securing co-operative routing among the different railroad companies.

Some one of these methods, or some better method, should be adopted to secure the economies of joint operation, and TO OBTAIN EFFICIENT LOCAL PASSENGER SERVICE ON OUR STEAM LINES BY THROUGH ROUTES.

CHAPTER II

STEAM LINES BEST FOR FAST LOCAL TRAVEL IN CHICAGO.

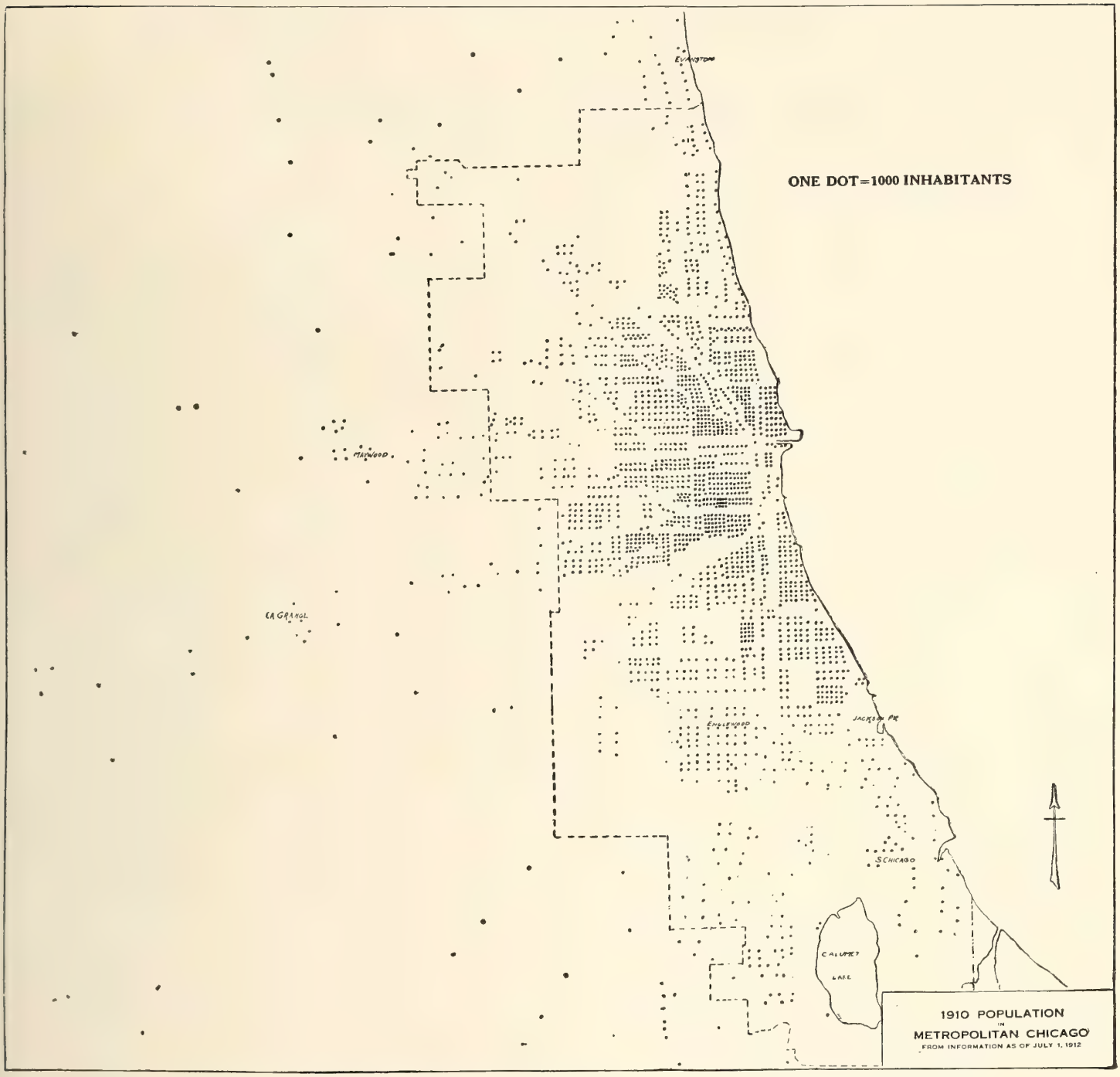


PLATE 2. MAP SHOWING DIFFUSION OF CHICAGO'S POPULATION. SCALE: 1 INCH = 4 MILES.

Chicago's noble distances demand speedy travel.

EACH dot on the map means 1,000 inhabitants. Many dots are scattered far.

Chicago proper covers 191 square miles; the real community covers a still greater space. It is unevenly spread through an area 15 miles east and west by 50 north and south.

While the chief pulsations of passenger traffic are to the center and back, innumerable journeys are made by an infinite variety of combinations between points here and points there throughout the whole area. Many of all these different journeys are long hauls. They demand speed.

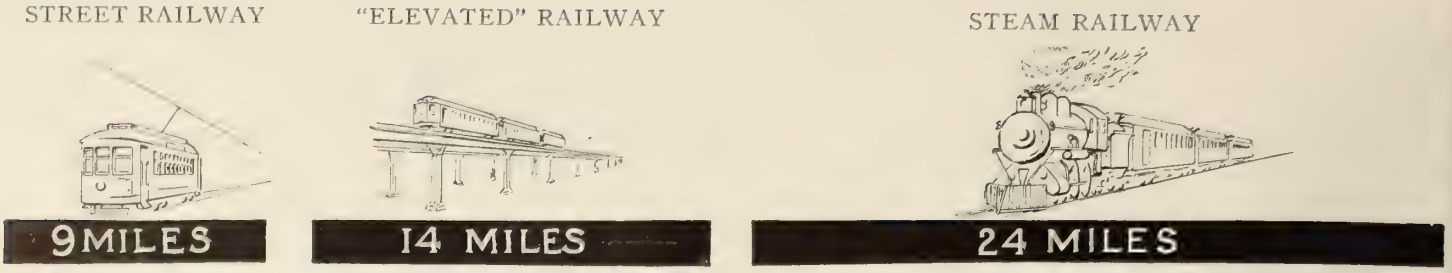
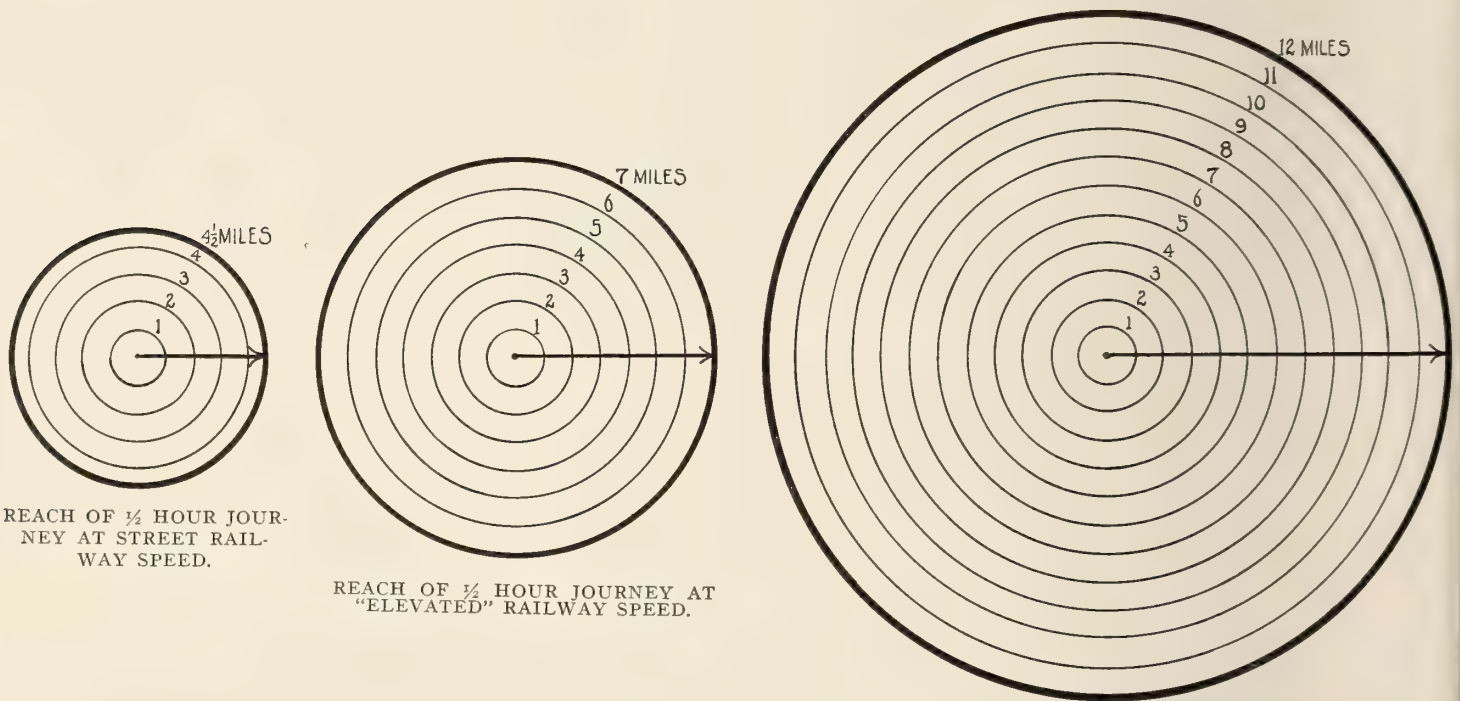


PLATE 3. DIAGRAM SHOWING AVERAGE SPEEDS PER HOUR OF PASSENGER TRAVEL IN CHICAGO.

Steam lines for speed.

According to Mr. Bion J. Arnold, Chicago street cars run about 4½ miles per hour in the central and 10½ in the outer zone; the "Elevated" local trains run 12 and the express 16 miles an hour; the steam local trains run 18 and the express 28 miles an hour. The approximate averages are shown above.



REACH OF ½ HOUR JOURNEY AT STREET RAILWAY SPEED.

REACH OF ½ HOUR JOURNEY AT "ELEVATED" RAILWAY SPEED.

REACH OF ½ HOUR JOURNEY AT STEAM RAILWAY SPEED.

PLATE 3A. DIAGRAM SHOWING REACH OF HALF-HOUR JOURNEYS BY CHICAGO'S DIFFERENT RAILWAY SPEEDS.

Speed is room.

If you ride on the street cars you must live near your work.

If you ride on the "Elevated" lines you can range farther.

If you ride on the steam lines you may choose your home from an area three times greater than if you ride on the "Elevated" lines and seven times greater than if you ride on the street cars.

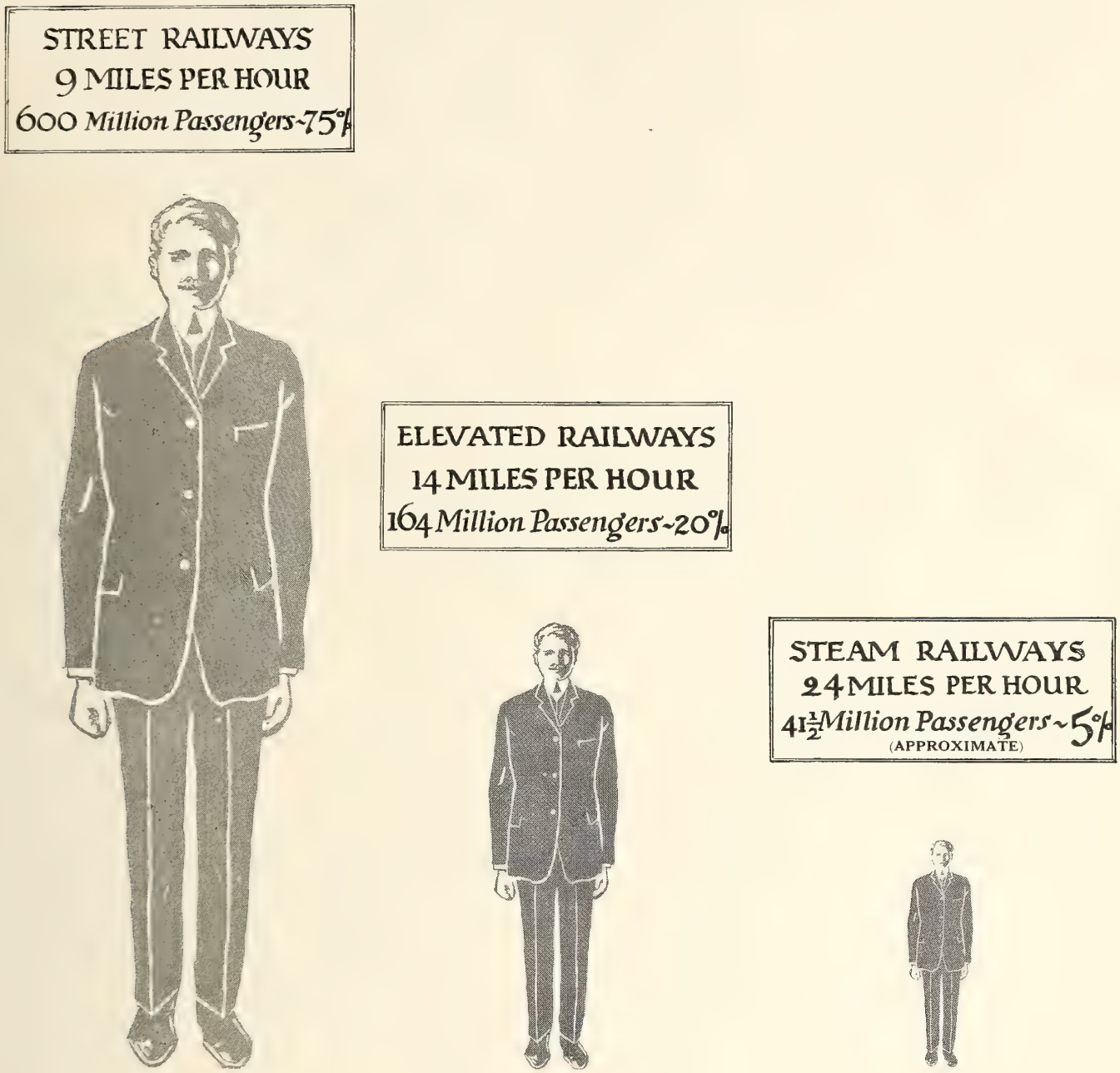


PLATE 4. LOCAL RAILWAY PASSENGERS PER YEAR IN CHICAGO.

The many travel slowly. Few travel speedily.

Of Chicago's 805,500,000 local railway passengers,* 75% ride by the slowest class of accommodations, the street railways; 20% ride by the next faster class, the "Elevated" railways; and only 5% ride by the fastest class, the steam railways.

The steam lines of Greater Berlin, with a far less mileage, carry 8 times as many local passengers as do those of Greater Chicago. Chicago's steam lines are not intensively used.

*414,000,000 street railway transfer passengers excluded. Arnold Report on Railroad Terminals, 1913.

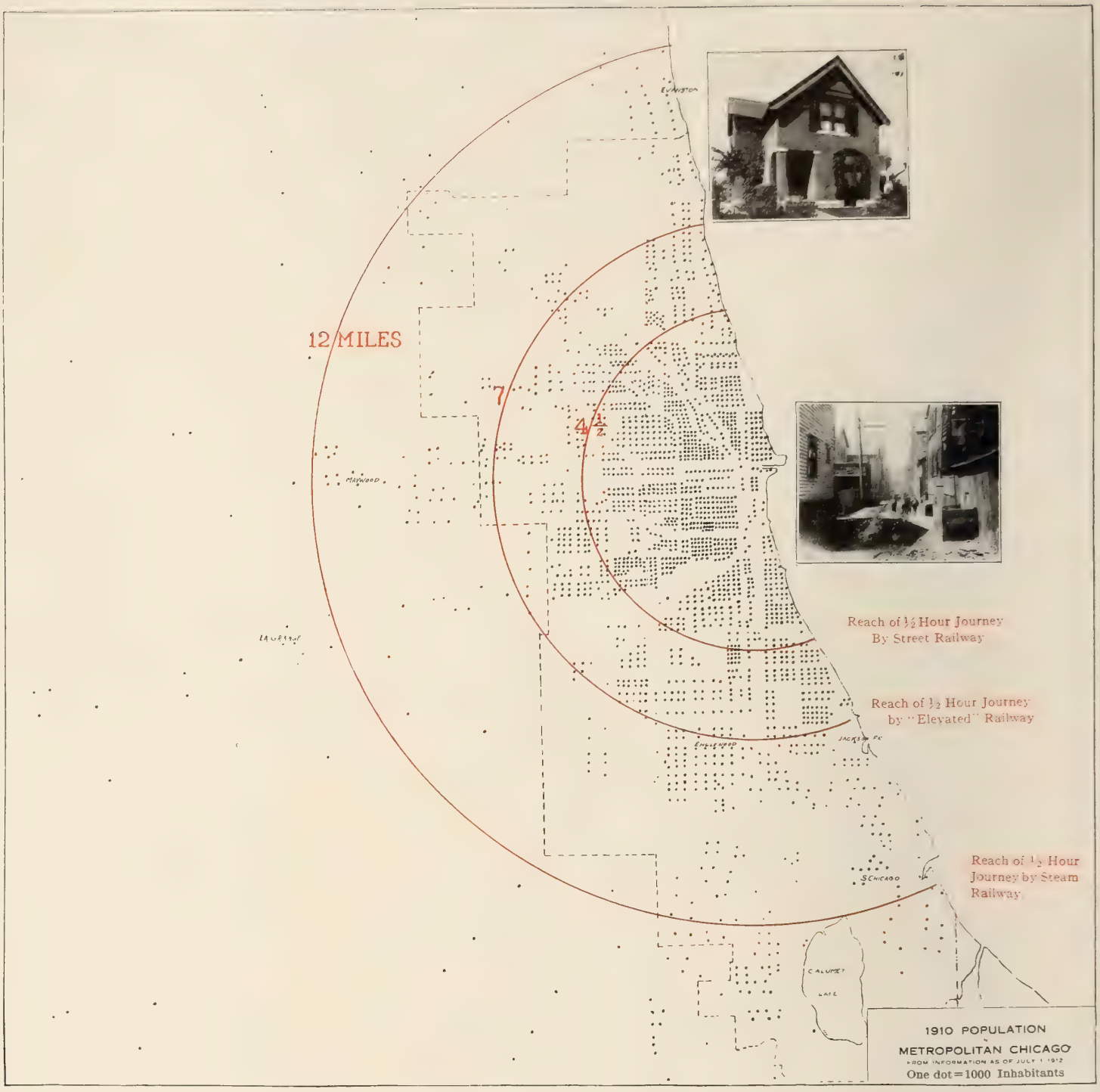


PLATE 5. MAP SHOWING DISTRIBUTION OF POPULATION AND AREA REACHED FROM GENERAL POST OFFICE BY HALF-HOUR JOURNEYS, AT AVERAGE SPEEDS, ON STREET, "ELEVATED" AND STEAM RAILWAYS.

Speed is home life.

There are great unoccupied tracts in and about Chicago where people might have ample homes and yards if they could reach them by good steam line service. The area which could be reached in a half hour, if such service were properly developed, is shown on the map in contrast to the more limited areas reached by street and "Elevated" railway journeys of like duration.

PLATE 6. CROWDED STREET CAR ON SOUTH HALSTED STREET, EVENING RUSH HOUR, IN JULY, 1913.

Steam lines for comfort.

Chicago pays $63,148,023 a year for local travel (Frederick Rex, Municipal Reference Librarian)—mostly by street, "Elevated" and steam railways—and should ride comfortably.

The standard of comfort on the street railways is disgraceful. The standard of comfort on the "Elevated" railways is only less disgraceful.

The standard of comfort on the steam railways is, saving minor exceptions and details, reasonable and satisfactory.

PLATE 7. DUST RAISED BY FAST-RUNNING STREET CAR.

Overspeeded street cars betray underworked steam cars.

The street cars are for a speed safe and appropriate in the public streets. They should not be forced to do the work proper to a high speed system.

Besides being overloaded, Chicago street cars are so overspeeded—for street cars—that largely from this cause they killed 165 persons in the year 1913. They also deluge people and homes with dust.

The street cars are overworked because the steam lines are under-worked.

PLATE 8. PARKED AUTOMOBILES IN "LOOP" DISTRICT—PLYMOUTH COURT.

Automobiles reflect inadequacy of steam service.

Why are the downtown streets so obstructed by moving or standing automobiles? In no small degree because of the deficient steam service.

The meager amount of fast and comfortable local passenger service on the steam lines leaves the public largely with no alternative but automobiles for such service.

CHAPTER III

FOR EFFICIENCY CHICAGO'S STEAM LINES NEED GENERAL REARRANGEMENT.

THE meager number of Chicago's local steam passengers is partly chargeable to the general disorder of its great steam railroad network.

Disorder means high cost of operation, and often poor accommodations. It thus discourages efforts to extend the service and so build up patronage.

These conditions, as a first requisite for their cure, demand that lines be rearranged.

PLATE 9. CHICAGO STEAM RAILROAD MAP—1850. (CHARLES K. MOHLER.)
SCALE: 1 INCH = 4 MILES.

A lost chance.

In 1850, there was but one railroad entering Chicago, and there were, of course, no interferences between lines.

The opportunity to lay down policies for a far-sighted scheme of orderly railroad development was not appreciated and was not taken advantage of.

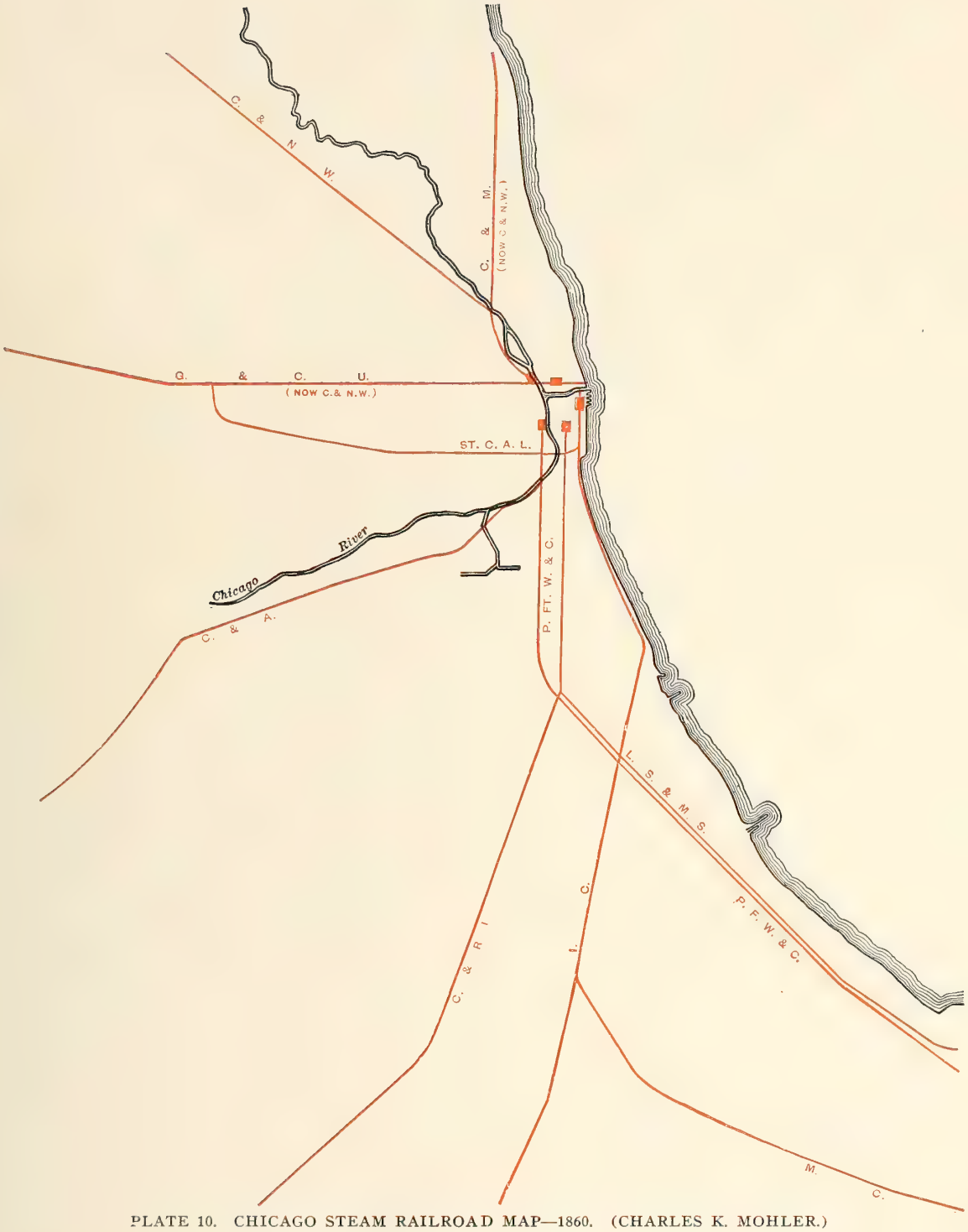


PLATE 10. CHICAGO STEAM RAILROAD MAP—1860. (CHARLES K. MOHLER.)

SCALE: 1 INCH = 4 MILES.

Disorder began early.

By 1860, railways and terminals had multiplied in Chicago. Four lines from the east, south and southwest ended in three downtown terminals.

Obviously the line nearest the lake should have entered the terminal nearest the lake, the line next nearest the lake the terminal next nearest the lake, etc., so as to avoid one line crossing another. But line No. 1, counting from the lake, entered terminal No. 2, counting from the lake; line No. 2 entered terminal No. 3; line No. 3 entered terminal No. 1, and line No. 4 entered terminal No. 2.

Every case was a misfit.

PLATE 11. CHICAGO STEAM RAILROAD MAP—1910. (CHARLES K. MOHLER.)
SCALE: 1 INCH = 4 MILES.

A colossal tangle.

The criss-crossing of railway lines—each line an independent enterprise and welcomed as such by a land-speculating public—which began so conspicuously in the fifties, has continued and grown, until we have our present network of steam railroads, one of the most remarkable examples of chaos ever produced by human activity.

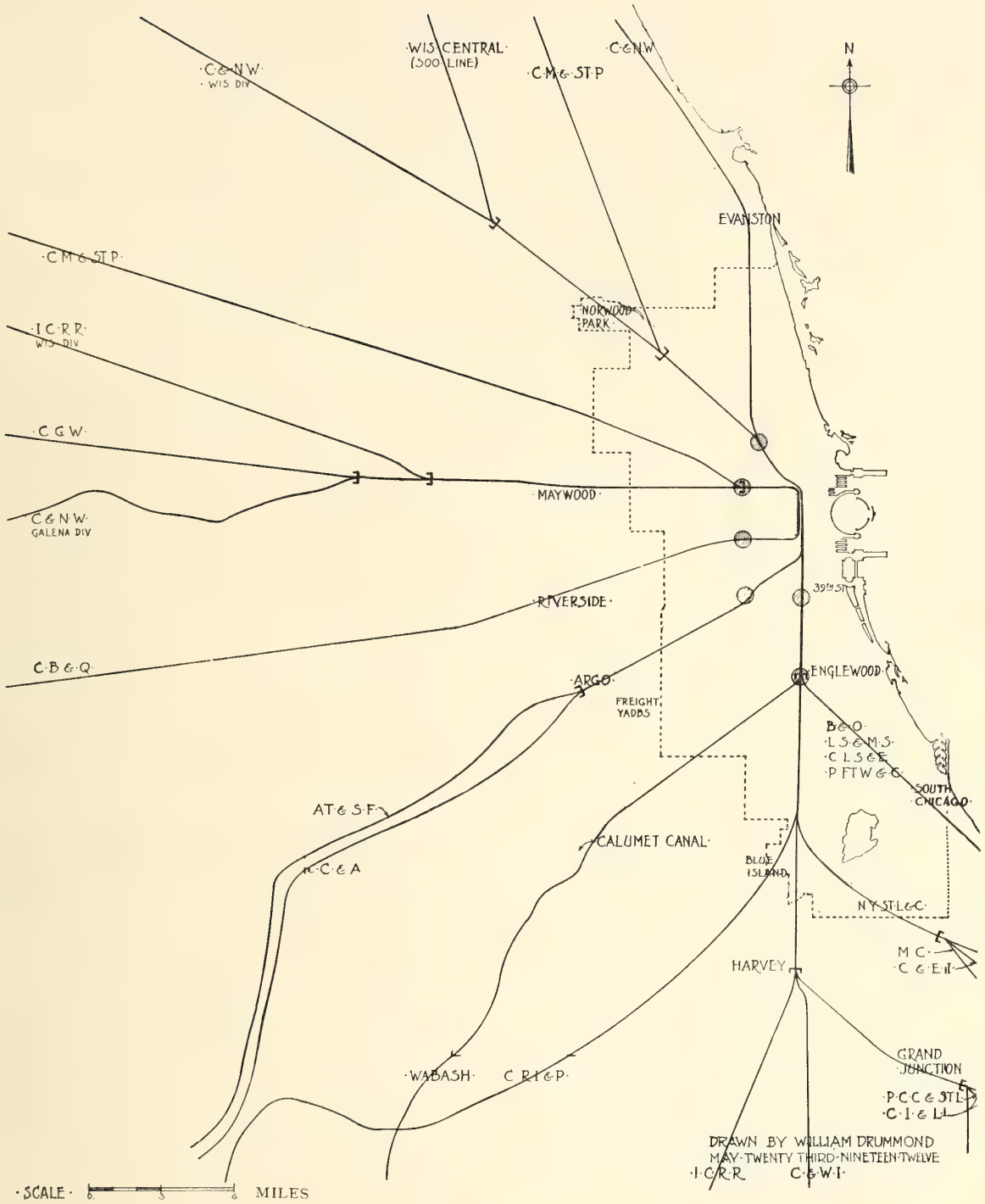


PLATE 12. PLAN FOR REARRANGEMENT OF CHICAGO'S STEAM LINES ON EXISTING RIGHTS-OF-WAY WITHOUT CROSSINGS. (WILLIAM DRUMMOND.)

Disorder unnecessary.

Intelligent control might have produced a far different result.

This ideal plan, by Mr. William Drummond, shows how the steam main lines (omitting the belts) might now be reorganized, on present rights-of-way, without a single crossing of one line by another. What a decrease in construction, maintenance and operating cost, what an increase in efficiency, what an improvement of the town it would have meant if the railroads had developed in this way!

PLATE 13. MAP SHOWING CROSSINGS OF STEAM RAILROADS BY STEAM RAILROADS IN CHICAGO DISTRICT, 1912. (CHARLES K. MOHLER.)

SCALE: 1 INCH = 4½ MILES.

Disorder means hundreds of crossings.

The seriousness of the existing confusion is most sharply evidenced in the great number of crossings of railroads by railroads.

Each dot in the map indicates such a crossing; a red dot meaning a crossing at grade, and a green dot one where grades are separated. According to Mr. Mohler, who completed the map in 1912, there were then in the Chicago district 239 such crossings at grade and 41 with grades separated—280 in all. A few grade crossings have since had their grades separated. No approximation to such a railroad mesh exists elsewhere on the globe.

PLATE 14. STEAM RAILROAD CROSSINGS AT GRADE. LOOKING NORTHEAST FROM CORNER OF STEWART AVENUE AND TWENTY-FIRST STREET. 1912.

Rearrangement of lines required.

The hundreds of crossings of railroads by railroads mean to Chicago an enormous commercial handicap in upkeep, accidents and delays. They explain in part why it takes, on the average, three full days merely to get a loaded freight car through the Chicago district, and ten days if the car is to be unloaded and then loaded again in the district. They explain many of the long detours, waits and slow-downs which impair steam passenger service in Chicago.

PLATE 15. STEAM RAILROAD CROSSINGS WITH GRADES SEPARATED. ILLINOIS CENTRAL LINE CROSSING OVER ATCHISON, TOPEKA & SANTA FE LINE AT SIXTEENTH STREET AND WENTWORTH AVENUE, LOOKING EAST. 1914.

Disorder means waste.

Grade separation is enormously costly, and is only a partial remedy.

Grade separation does not cure a mistaken location or connection of lines, but leaves them still in their round-about courses. It disarranges streets, mars the face of the city and introduces trying railroad grades.

Some lines even cross each other at one point and then cross back again at another point. An interchange of parts of such lines, obviating the crossings themselves, would be the only thorough remedy.

General rearrangement of lines, rather than grade separation here and there, is the treatment needed.

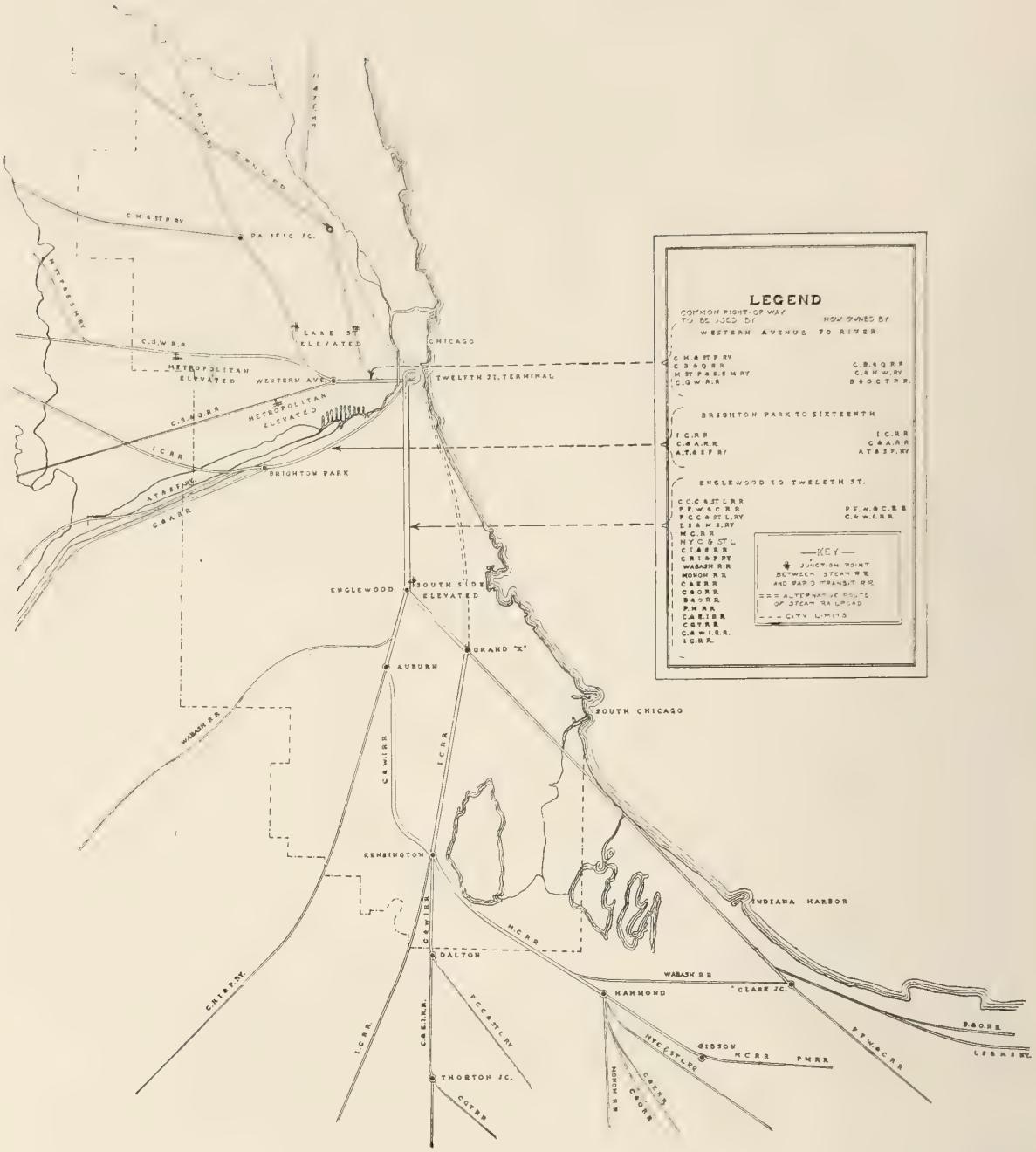


PLATE 16. MAP OF CHICAGO SHOWING PROPOSED CONCENTRATION OF STEAM LINES UPON THREE APPROACHES TO BUSINESS DISTRICT. (JARVIS HUNT. 1913.)

SCALE: 1 INCH = 4.7 MILES

Rearrangement repeatedly urged.

The Railway Terminal Commission of 1892 recommended that the steam lines entering the city be concentrated upon three main elevated approaches, one from the south, one from the west, and one from the north. Mr. Jarvis Hunt has recently proposed a definite scheme, shown above, for rearranging on that principle the railroad approaches to the business district. This would almost wholly eliminate crossings of railroads by railroads.

PUBLIC MUST PAY FOR ELECTRIFICATION

"If it costs $100,000,000 or $400,000,000 to electrify the terminals in Chicago, the question is, Will the commerce of Chicago bear the burden? . . . Commerce must pay; you business people must pay!

"I feel it is premature to be seriously considering the electrification of the terminals of the railroads in Chicago. It is premature to put such a burden upon commerce."

(*Marvin Hughitt, then President Chicago and Northwestern Railroad, at private meeting of representatives of Chicago Association of Commerce and railroad presidents, September, 1910—News item.*)

Rearrangement would facilitate electrification.

Electrical, or some other form of smokeless operation of steam lines in Chicago, will presumably be required by the city in the near future.

There are 2,800 miles of steam railway tracks of different sorts within the city limits. The cost of electrification would be materially lessened if that enormous mileage were reduced, as it could be, by a proper rearrangement and concentration of tracks and lines. Economy as well as efficiency demands that rearrangement should precede or accompany electrification.

The public, as Mr. Hughitt truly says above, must ultimately foot the bill. We can far better afford to electrify if we first, or at the same time, concentrate and simplify.

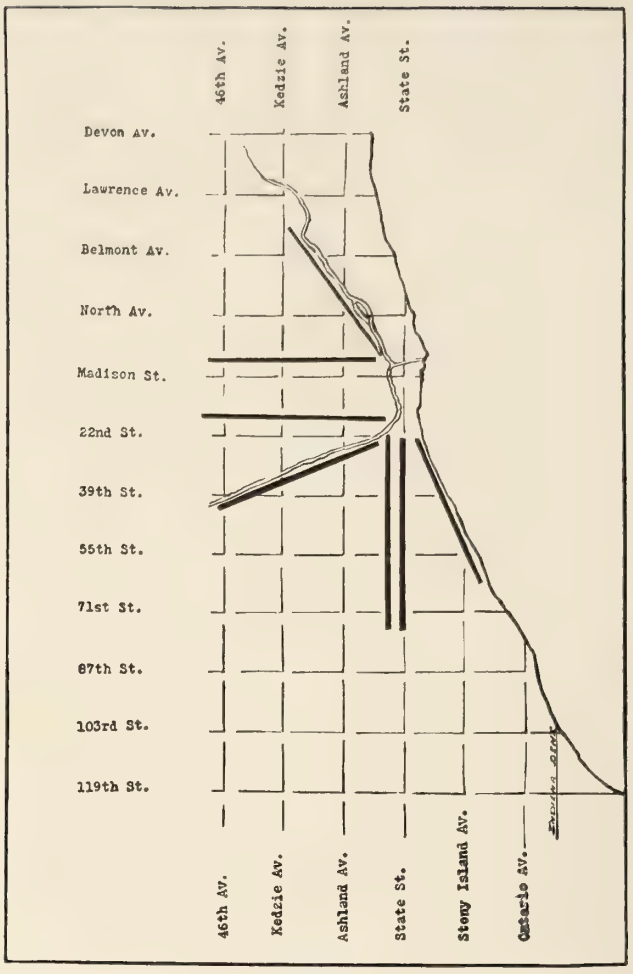


PLATE 17. MAP SHOWING SEVEN MAIN RAILWAY ENTRANCES INTO CHICAGO. (FREDERIC A. DELANO.)

Rearrangement would release mileage for a local passenger system.

In a proper rearrangement of Chicago's steam lines, it is probable that, without prejudice to long-distance traffic, and at reasonable cost, there could be set aside numerous lines, which, if wisely supplemented here and there with connections and branches, would suffice for a widespread—eventually electrified—system for local high-speed passenger service.

There are seven chief railroad entrances into Chicago, having from four to ten tracks each, or a total of 54 tracks. If half of these tracks be considered as devoted to freight business, the other half would far exceed the number needed for the efficient operation of the 1,339 passenger trains which enter or leave the six Chicago terminals daily. The 145 passenger trains operated on all tracks during the rush hour, if divided among 27 tracks, would average under six trains per track per hour, and the greatest frequency, too, of rush-hour passenger trains on any track at present is only 16 per hour, whereas, under proper conditions, from 25 to 30 trains per track per hour could be safely operated.

There is therefore a considerable margin of unused steam track capacity which might presumably be devoted to a system for rapid local passenger service. Such service would also be in the air and sunlight, because most of the steam lines are already elevated or about to be elevated above the streets.

An unhampered rearrangement of the general steam network of the city, with special reference to local passenger service, is the needed treatment for that network.

CHAPTER IV

THROUGH-ROUTE PRINCIPLE ESTABLISHED IN CHICAGO—EXCEPT ON STEAM LINES.

ANY rearrangement, limited or general in extent, of the steam passenger lines of Chicago, should be designed primarily to provide for the best routing of trains. This is required both for passenger efficiency and for normal city development.

Two routing plans, very different in their results, may be employed; one, terminal routing—the other, through routing. On a typical terminal route, cars would run, say, from the outskirts of the city to the business district, and return. On a typical through route they would continue through the business center to another side of the city, and return. The one method tends toward the abnormal concentration, and the other toward the normal distribution of business.

By a prolonged struggle, Chicago has been extending the through-route principle over its various agencies of communication, excepting the steam lines

PLATE 18. DIAGONAL ROADS—MANY OF THEM FORMERLY TOLL ROADS—APPROACHING CHICAGO'S BUSINESS DISTRICT.
SCALE: 1 INCH = 2.2 MILES (APPROXIMATE).

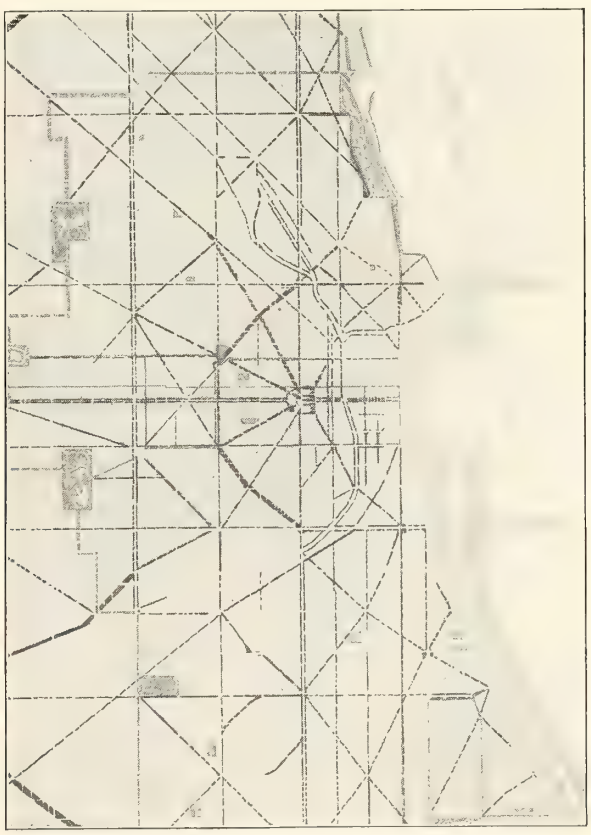


PLATE 19. PROPOSED NEW OR WIDENED STREETS —COMMERCIAL CLUB "PLAN OF CHICAGO," 1909.
SCALE: 1 INCH = 2.2 MILES.

The through-route principle established in Chicago for streets.

With occasional interruptions here and there, the street system of Chicago is a through-route system. Even the old diagonal turnpike roads, which, on the map, end abruptly, really lead into streets affording continuous passage through the heart of town. Yet the Commercial Club "Plan" for the improvement of Chicago recommended the gradual creation or widening, at enormous cost, of nearly 150 miles of streets, in order to secure for the city a more efficient through-route street system.

The city has also recognized the importance of such a street system by adopting the policy of laying the best pavements on through traffic streets.

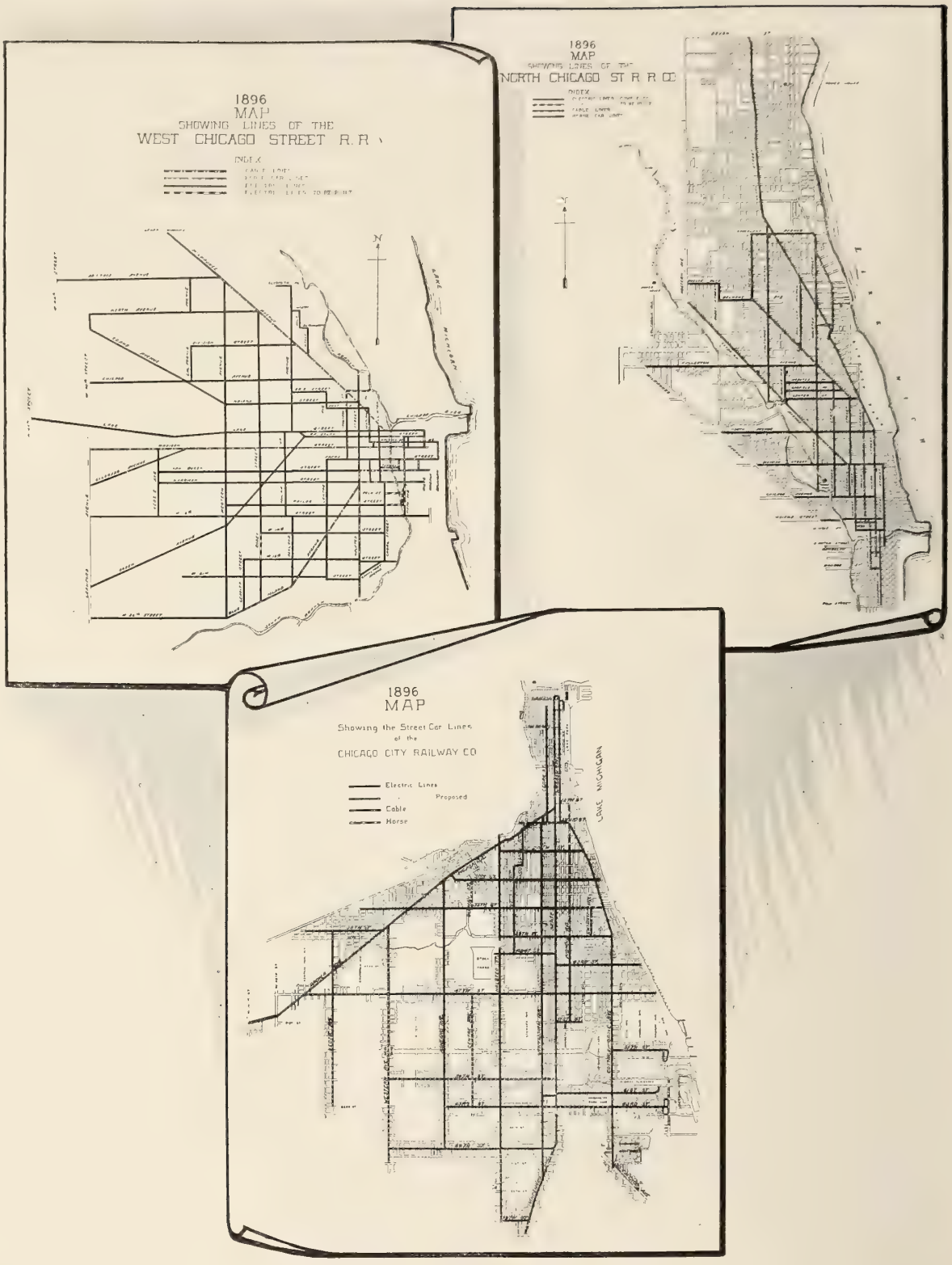


PLATE 20. CHICAGO'S DIVISIONAL STREET CAR SYSTEMS—1896.
SCALE: 1 INCH = 2 MILES. (APPROXIMATE)

Through routes for street cars long sought in Chicago.

The agitation for street car through routes in Chicago began in 1898 with the report of a special street railway committee of the City Council.

Up to 1907 the street railways were chiefly operated in three separate systems, each terminating in the business district. There was not a through route in the city.

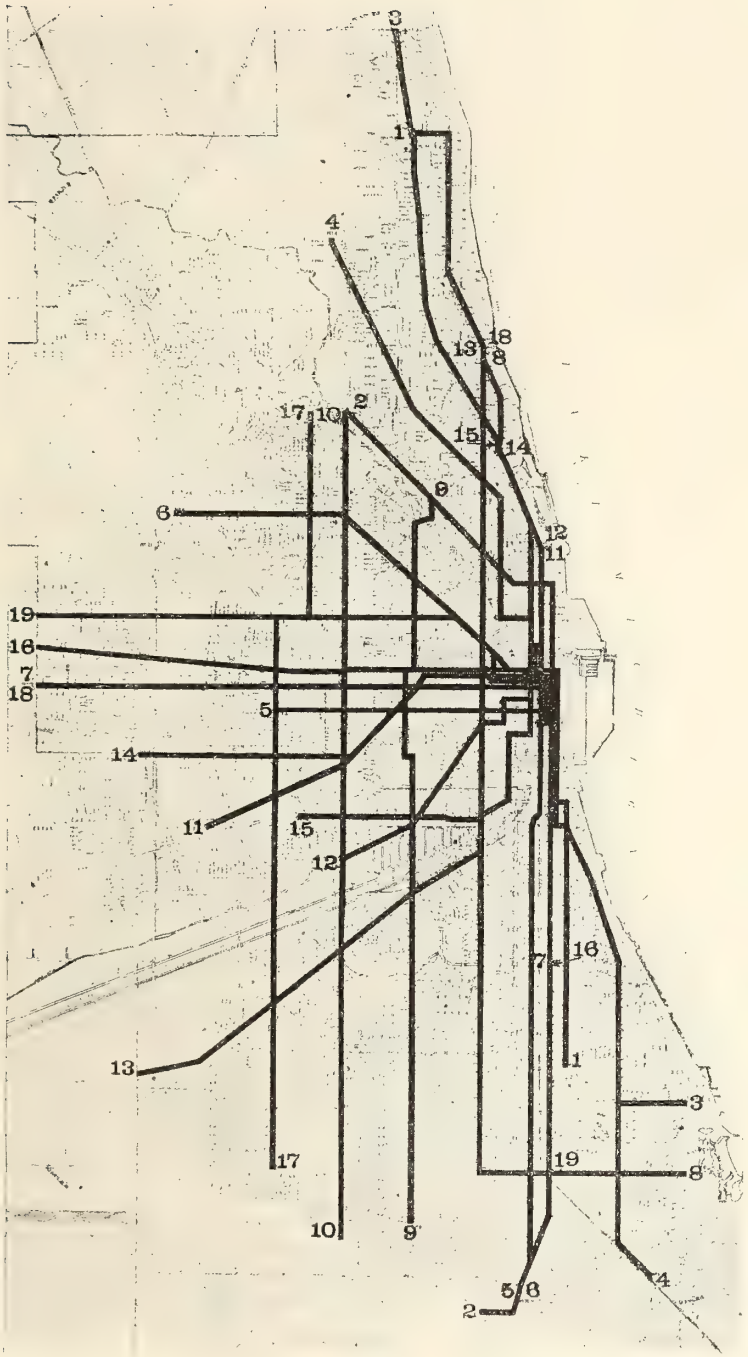


PLATE 21. MAP SHOWING THE THROUGH ROUTES REQUIRED BY STREET RAILWAY ORDINANCES OF 1907. (BOARD OF SUPERVISING ENGINEERS—CHICAGO TRACTION. 1912.)

SCALE: 1 INCH=3 MILES. (APPROXIMATE)

The through-route principle established in Chicago for street railways.

The traction ordinances of 1907 provided for nineteen through routes, and further legislation for street car through routing was adopted in city ordinances of July 15, 1912, and November 13, 1913.

Although a sufficiently extensive through-route system for street cars has not yet been put into effect, it is now the settled policy of the city to promote such routes generally.

PLATE 22. CAR BLOCKADE ON CLARK STREET, DUE TO SWITCH-BACK OPERATION AT WASHINGTON STREET. LOOKING NORTH FROM MONROE STREET.

Consequences of terminal routing.

It is the lack of through-routing which explains the "backing up" — until recently — of Clark street cars south of Washington street. The switch-back at Washington street which caused this blockade has now been displaced by a loop—the alternative and scarcely less objectionable form of terminal routing.

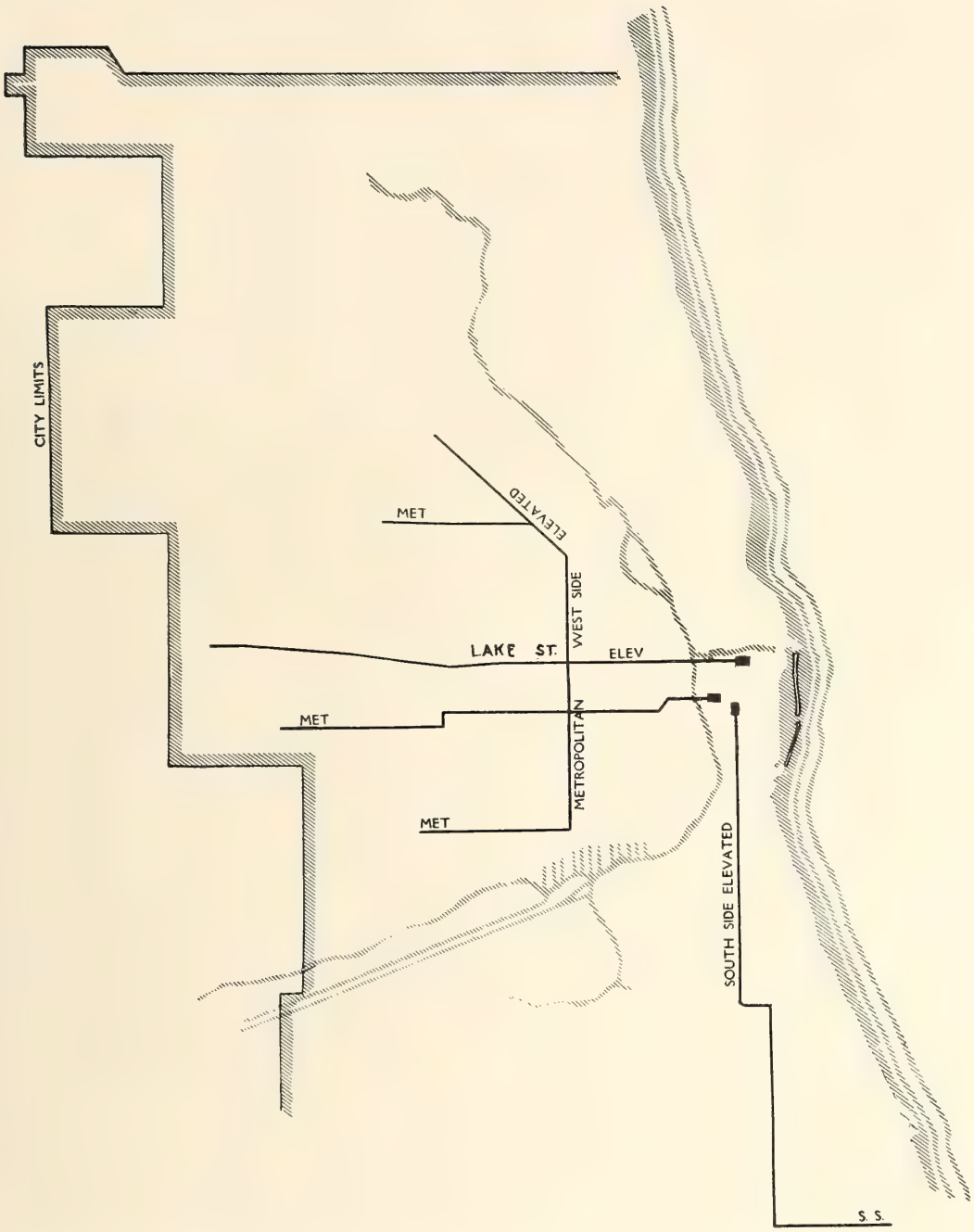


PLATE 23. PLAN SHOWING FORMER TERMINAL ROUTING ON CHICAGO'S "ELEVATED" LINES, 1897.
SCALE: 1 INCH = 2.4 MILES.

Through "Elevated" routes long sought in Chicago.

For a dozen years the agitation has been going on for through-routing trains on the "Elevated" railways. Up to 1897 the "Elevated" lines terminated at various downtown points—where the trains were reversed by the ordinary switch-back method.

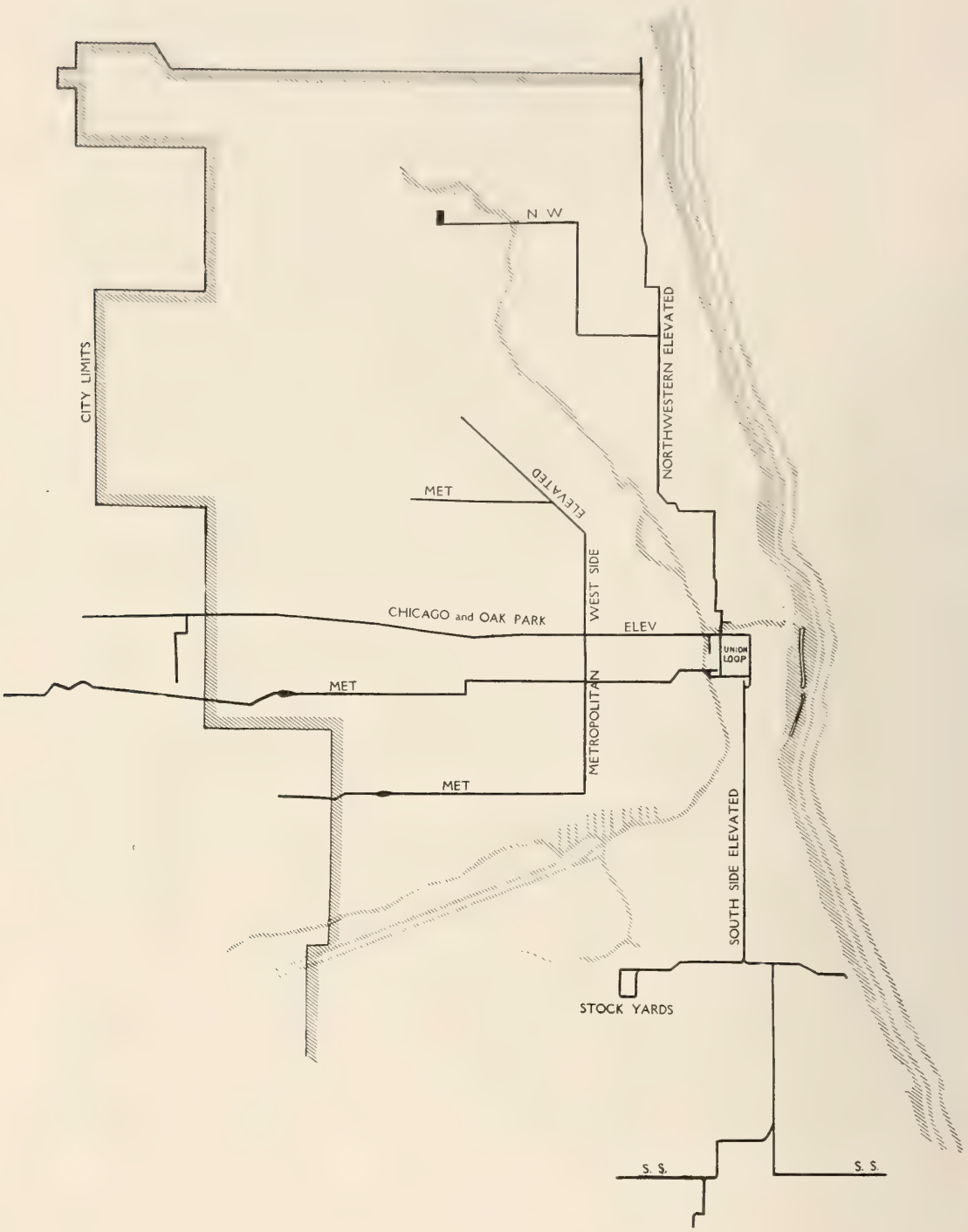


PLATE 24. PLAN SHOWING "LOOP BACK" ROUTING ON "ELEVATED" LINES, 1913.
SCALE: 1 INCH = 2.4 MILES.

Loop terminal adopted for "Elevated" lines.

In 1897, Mr. Yerkes built the "Elevated" loop, by which trains on all the different lines thereafter reversed their direction by running around the loop, instead of by switching back. This made transfer between lines on the "loop" easy; but with increased traffic, "loop" operation soon choked the tracks with interfering trains.

PLATE 25. TRAIN BLOCKADE ON "ELEVATED" LOOP: FIFTH AVENUE, LOOKING NORTH FROM VAN BUREN STREET, 1912.

Consequences of "loop" terminal operation.

It is the lack of through-routing, or of a well-devised plan of through-routing, which explains train blockades on the "Elevated" lines.

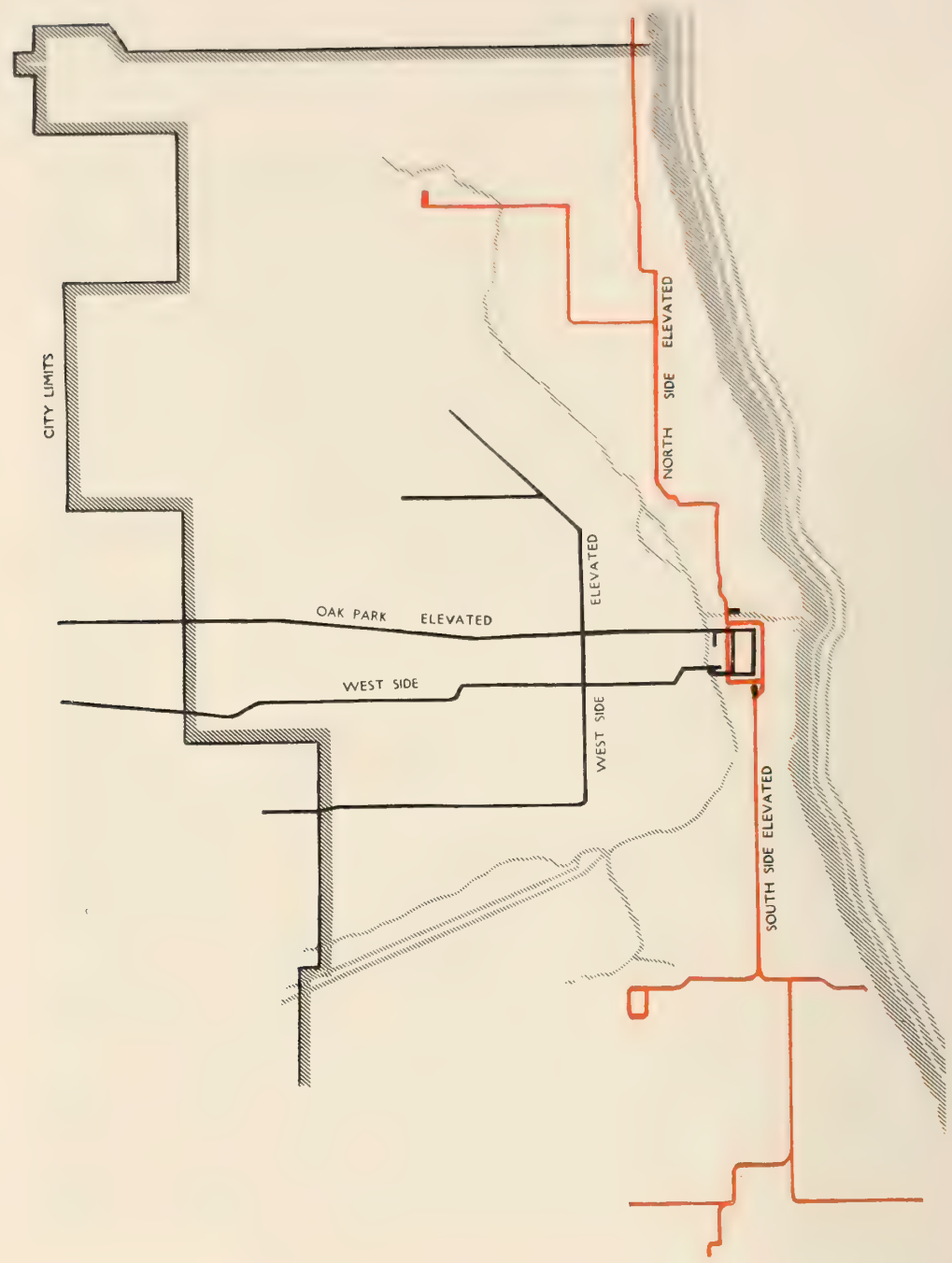


PLATE 26. PLAN SHOWING (IN RED) THROUGH-ROUTING ON THE "ELEVATED" LINES, 1914.
SCALE: 1 INCH = 2.4 MILES.

The through-route principle established in Chicago for "Elevated" railways.

Last November, a through-routing ordinance went into effect for the "Elevated" lines, and, under it, a scheme of partial through-routing—not yet satisfactorily worked out—is accordingly in operation. It is now the city's policy to have through-routing maintained on the "Elevated" lines.

CHAPTER V.

THROUGH ROUTES THE PARAMOUNT NEED FOR THE STEAM LINES OF CHICAGO.

THE through-route principle, already applied to the streets, and already adopted for and in part applied to the street railways and the "Elevated" railways, is most conspicuously of all needed for the passenger steam railways.

The terminals of these railways are not even situated so that direct or even practicable transfers can take place between them for local travel. They are instead planted at arbitrary points distant from an eighth of a mile to a mile and an eighth from each other. These terminals also illustrate the same grave objections which attach to such terminals generally: they are inefficient for local transportation; they waste space, interfere with streets, cost extravagant sums, congest business, and distort city growth.

Through routes essential for efficiency of steam lines.

Not a through steam route exists in Chicago. The plan at the right shows the six arbitrarily located and disconnected downtown terminals at which Chicago's steam passenger lines for local as well as long-distance service now end.*

This plan makes it plain why the passenger business of these lines, although they represent the highest standard of speed in Chicago, and although Chicago distances demand that speed, is so conspicuously small. It is chiefly because they are operated on the terminal instead of the through-route plan. No passenger can ride through and beyond the central district, or—save on the Illinois Central—choose between more points of arrival than one in that district. This lack of continuity is fatal to any large development of local passenger traffic on the steam lines.

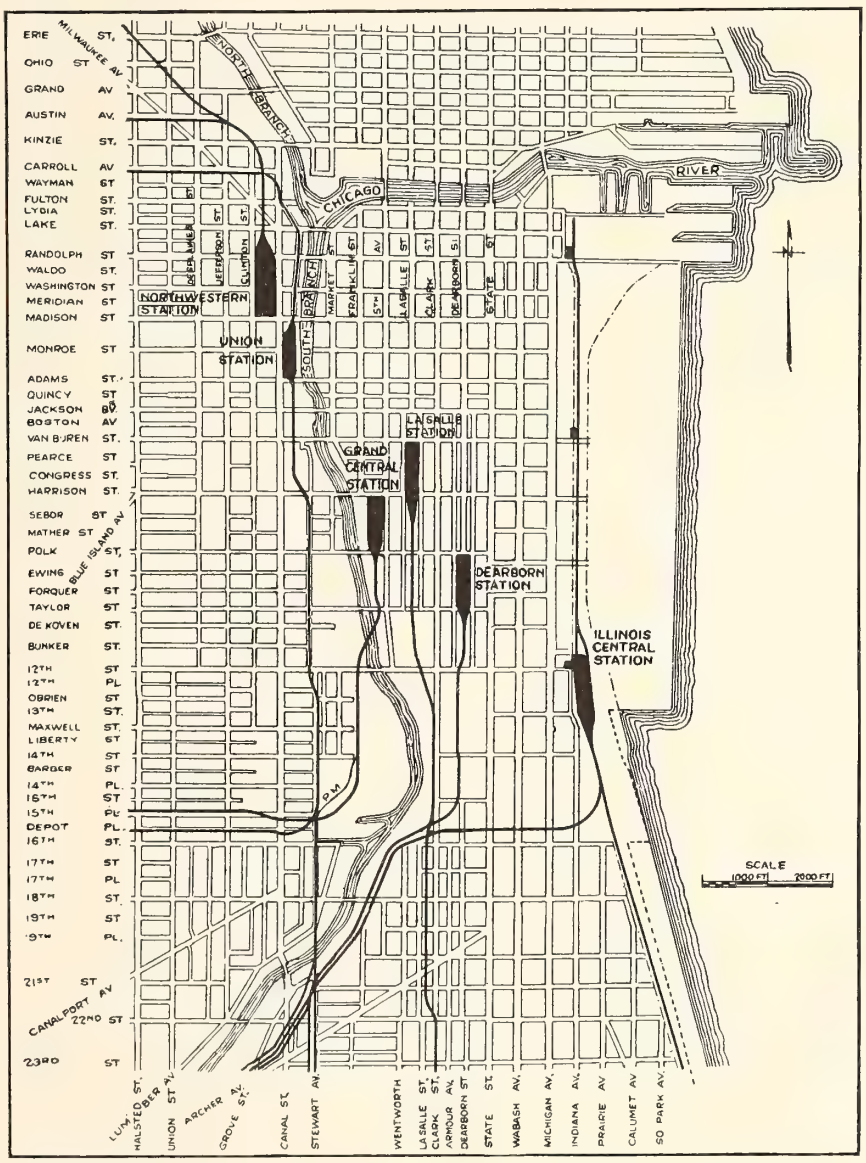


PLATE 27. MAP SHOWING LOCATION OF CHICAGO'S STEAM PASSENGER TERMINALS, 1914.

The necessity of replacing terminals and terminal routes on these lines by through stations and through routes is further enforced by many objections inherent in steam line terminals irrespective of their location with reference to each other.

*The Illinois Central terminal for local service is at Randolph street.

PLATE 28. TYPICAL COUNTRY TOWN HITCHING RAIL.

The terminal a village relic.

The terminal idea fits the village, but not the great city. The farmers driving into town from various directions are fully accommodated by the one hitching rail—or terminal. From there they can in two or three minutes reach, by walking, any other desired point in the little village.

PLATE 29. VIEW IN BUSINESS DISTRICT OF CHICAGO LOOKING NORTHWEST FROM TRANSPORTATION BUILDING. ARROW INDICATES LA SALLE STREET TERMINAL, 1914.
(PHOTOGRAPH BY J. W. TAYLOR.)

Terminal idea outgrown by Chicago.

A single downtown "hitching rail," or terminal, wherever located and however glorified architecturally, is not sufficient accommodation for any steam line's passengers into and out of Chicago's business area.

From the La Salle street terminal, shown in the foreground above, a passenger may, on foot, reach any point in the congested loop district in 10 or 15 minutes. Chicago's real business district, however, is, or is fast coming to be, an area stretching a mile and a half east and west by three miles north and south. Steam line passengers should, if practicable, have, without changing cars, a choice of several stations located in different parts of that area. A through route would afford such choice.

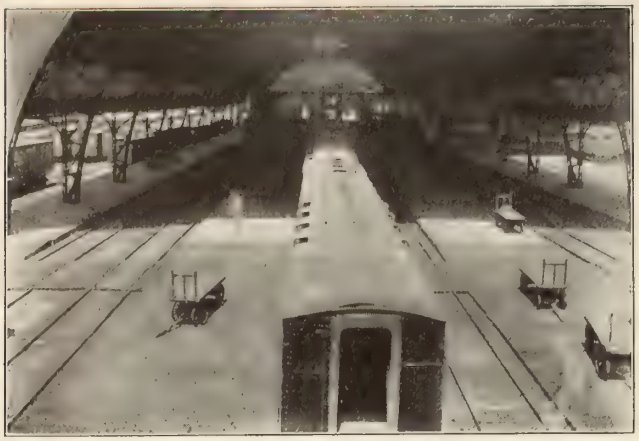


PLATE 30. TRAIN SHED OF GRAND CENTRAL TERMINAL, CHICAGO.

Idle tracks and standing trains are characteristic of the terminal train shed.

PLATE 31. TYPICAL WAITING ROOM IN RAILROAD TERMINAL.

Their great "waiting" rooms are an unconscious satire upon railroad terminals—advertising, not their success, but their failure.

PLATE 32. BUSSES AND CABS AT DEARBORN STREET TERMINAL, CHICAGO.

The characteristic line of waiting busses which crowd the street in front of the Dearborn street terminal represent inefficient use of street space.

PLATE 33. IDLE CARS AT STREET RAILWAY TERMINAL OPPOSITE DEARBORN STREET TERMINAL, CHICAGO.

One terminal implies another of some sort, meeting or facing it, each with waiting vehicles. A typical case is shown above where a street car terminal fronts the Dearborn street railroad terminal. Waiting street cars as well as steam cars mean waste of space.

PLATE 34. CAB STAND SPACE AT RAILROAD TERMINAL, BRUSSELS.

Great numbers of cabs occupy room near railroad terminals for indefinite lengths of time, waiting for "fares." If trains went on through the city, stopping at several stations, more passengers could reach their destinations without cabs.

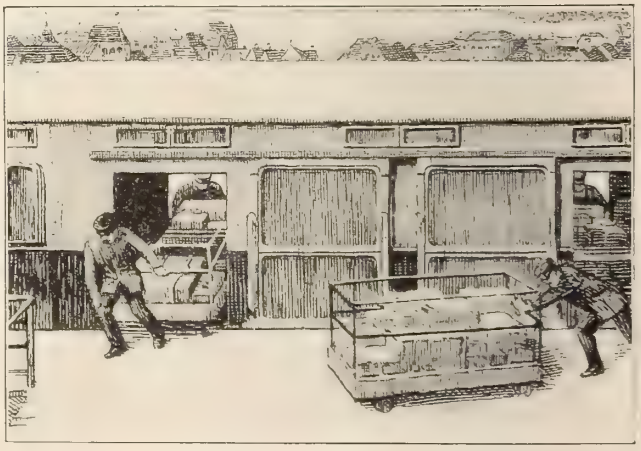


PLATE 35. SUGGESTIONS FOR HANDLING BAGGAGE AND EXPRESS AT STATIONS. (AUGUST SCHERL.)

Terminals, ending the journey, encourage leisurely operating methods. Through-routing, representing continued train movement, encourages the shortening of station stops by every practicable device. To shorten those stops is to reduce the trackage and so the size of stations.

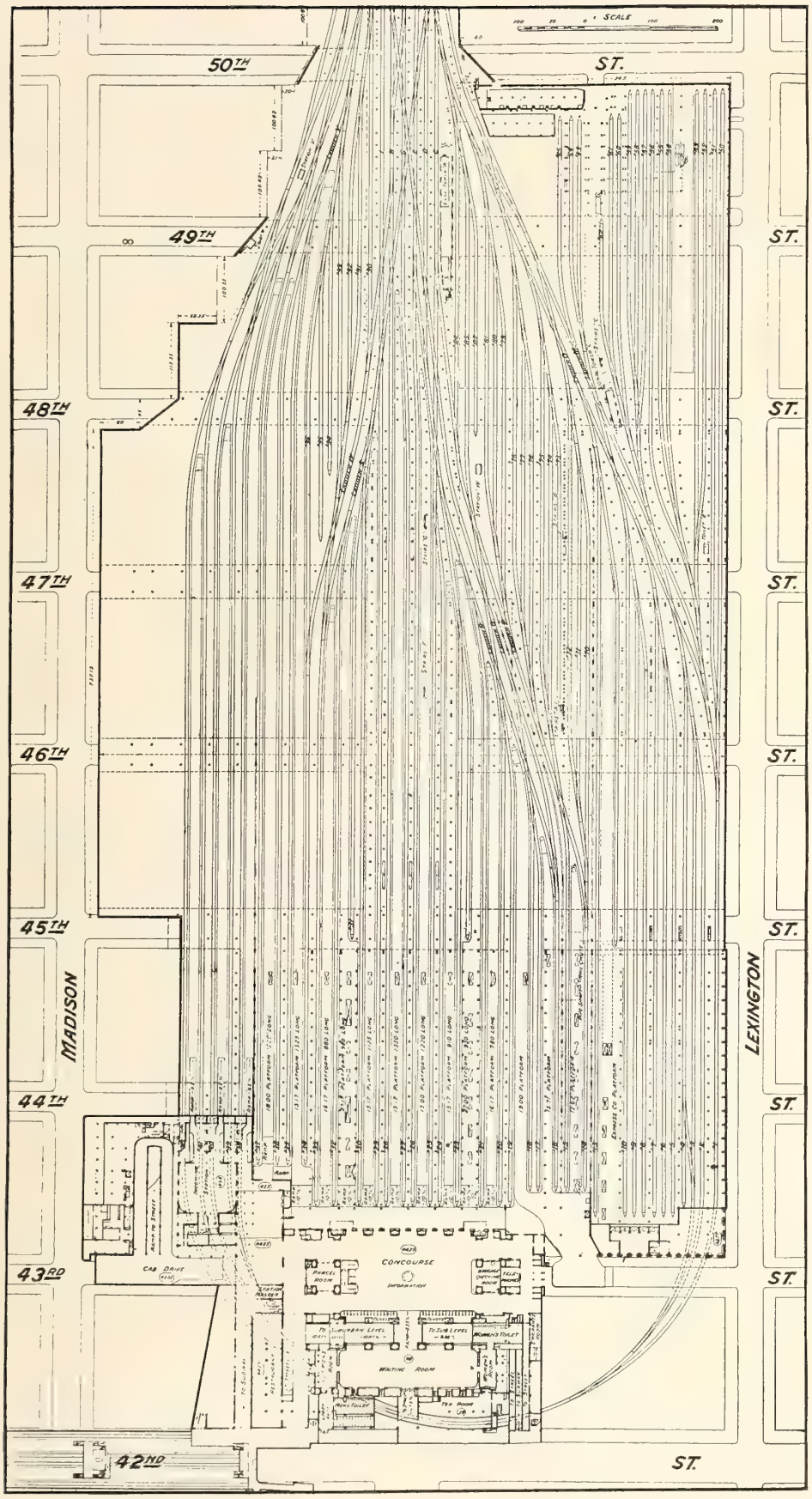


PLATE 36. ONE OF THE TWO SUB-STORY TRAIN YARDS OF THE GRAND CENTRAL TERMINAL, NEW YORK.

Train operation in a terminal requires probably 2 or 3 times the tracks and switching room required by a through-route station. The new Grand Central terminal in New York has two train yards, occupying two sub-stories one-third of a mile long and comprising together sixty-seven tracks.

PLATE 37. TRAIN SHED AND YARD OF CHICAGO & NORTHWESTERN PASSENGER TERMINAL, CHICAGO. 1914.

Terminals interfere with streets.

The new Chicago & Northwestern terminal was recently characterized by an alderman in the City Council, and later by the Mayor in the Railway Terminals Committee, as "a monstrosity," because of its impairment of streets crossing under its wide train shed and yard. Those streets pass through subways 300 feet long.

The width of the Chicago & Northwestern station and train shed could probably be reduced at least one-half by through-routing.

PLATE 38. RANDOLPH STREET, CROSSING UNDER TRAIN YARD OF CHICAGO & NORTHWESTERN RAILROAD TERMINAL. LOOKING EAST. 1913.

Chicago's steam passenger terminals close several streets entirely—Franklin from the north, Monroe from the west, Dearborn from the south. They turn other streets, as illustrated above, into low, dark tunnels.

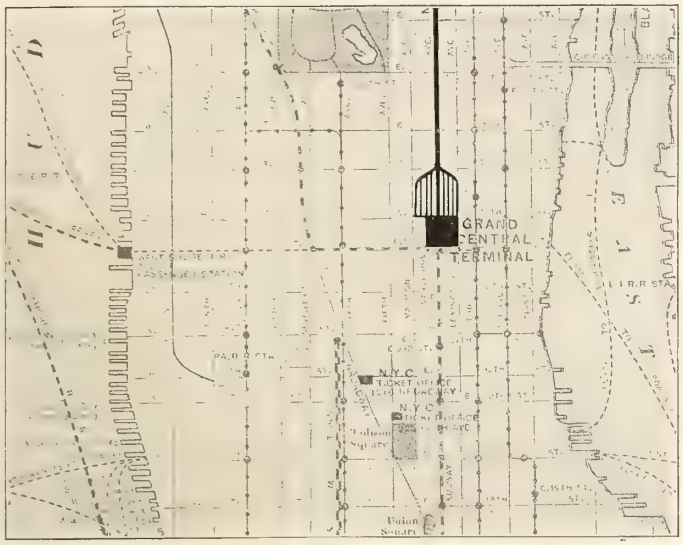


PLATE 39. MAP SHOWING GROUND AREA OF GRAND CENTRAL TERMINAL, NEW YORK. SCALE: ¼ INCH = 1,000 FEET.

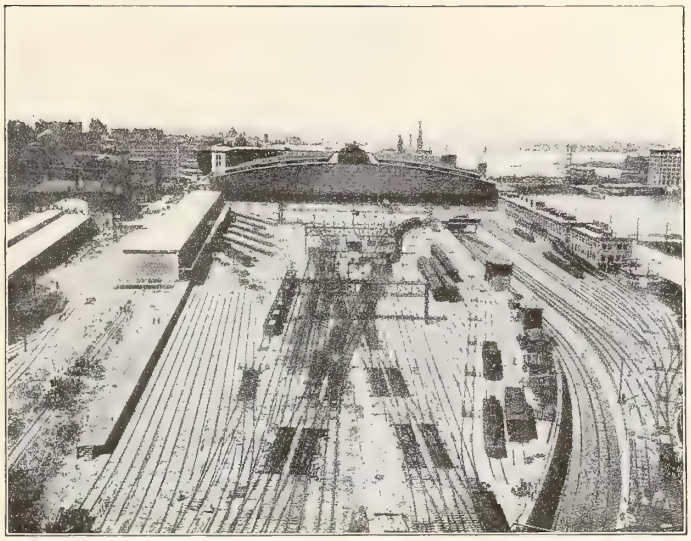


PLATE 40. SOUTH UNION TERMINAL—TRAIN SHED AND YARD. BOSTON.

The new Grand Central terminal in New York extends one-tenth of the way across Manhattan Island. The area of the old terminal was 23 acres; that of the new is 47 acres. Despite its two sub-stories it is so enormous that it is planted squarely across 4th avenue, one of the city's few north and south arteries. All traffic on that avenue must make a detour and four turns to get around the head house.

The new Pennsylvania passenger terminal in Chicago is proposed to have an area of about 30 acres, as against about 6 acres for the old terminal.

Because of the enormous space demanded by terminals, they are "pushed back" to inconvenient locations to get sufficient room. The South Union terminal, Boston, and its train yard occupy so much room that they had to be remotely placed on the water front where the streets did not need to be continuous.

PLATE 41. THROUGH-ROUTE RAILROAD STATION AT DRESDEN.

PLATE 42. THROUGH-ROUTE STEAM LINE CROSSING IMPORTANT STREET IN VIENNA.

Through-route station minimizes obstruction to streets.

The through-route station represents intensively used tracks, comparatively few in number and directly co-ordinated with cross lines. It may be introduced therefore in central locations where terminals of equal capacity would be impracticable, and, if properly constructed, may be so narrow that it can even be elevated over the streets without being particularly objectionable.

The through-route station at Dresden—with its few intensively used tracks necessitating only narrow viaducts over streets, and crossed by a street car route—is in the midst of high class development on both sides.

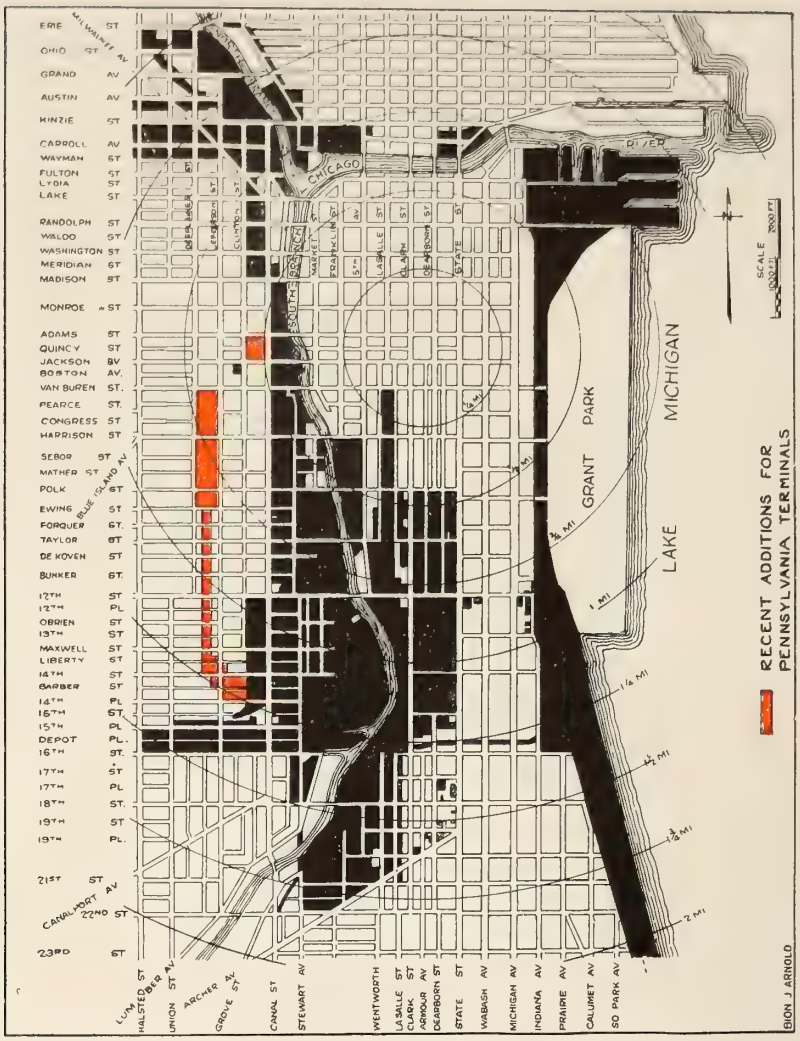


PLATE 43. MAP SHOWING AREA OF STEAM RAILROAD OWNERSHIP AROUND BUSINESS DISTRICT OF CHICAGO, 1913. (ARNOLD RAILROAD TERMINAL REPORT.)

(Area in red south of Van Buren street has been abandoned as sight for freight terminal, 1914).

Terminals distort city's growth.

Owing to their great size, passenger terminals, even at their best, and especially when multiplied in a limited area, tend not only to interrupt the flow of business here and there, but to derange the plan and development of that whole area. Chicago's numerous passenger terminals are an important element of the "Chinese Wall" of disordered railroad terminal property which isolates the kernel from the rest of the natural business district, and distorts the natural development of that district.

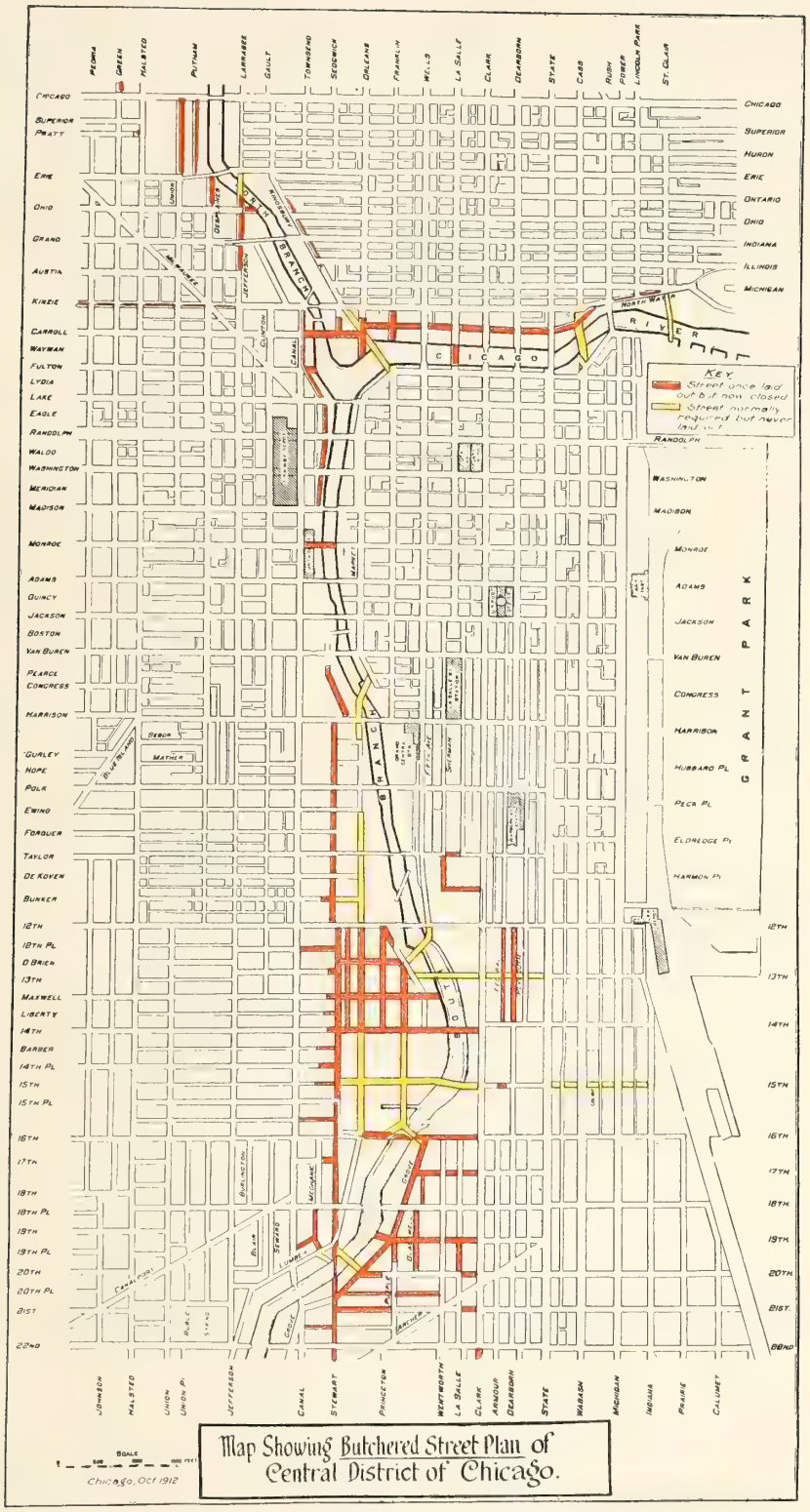


PLATE 44. MAP OF CENTRAL DISTRICT OF CHICAGO SHOWING, IN RED, STREETS CLOSED, AND, IN YELLOW, STREETS NORMALLY REQUIRED BUT NEVER LAID OUT. (CHARLES K. MOHLER, 1912.)

The terminal wall obliterates street plan.

Owing to railroad occupation—and to the crooked south branch of the Chicago river—the street plan of central Chicago has been completely cut to pieces. The red lines indicate streets closed by railroad occupation. The yellow lines indicate streets needed but never opened, chiefly because of railroad occupation.

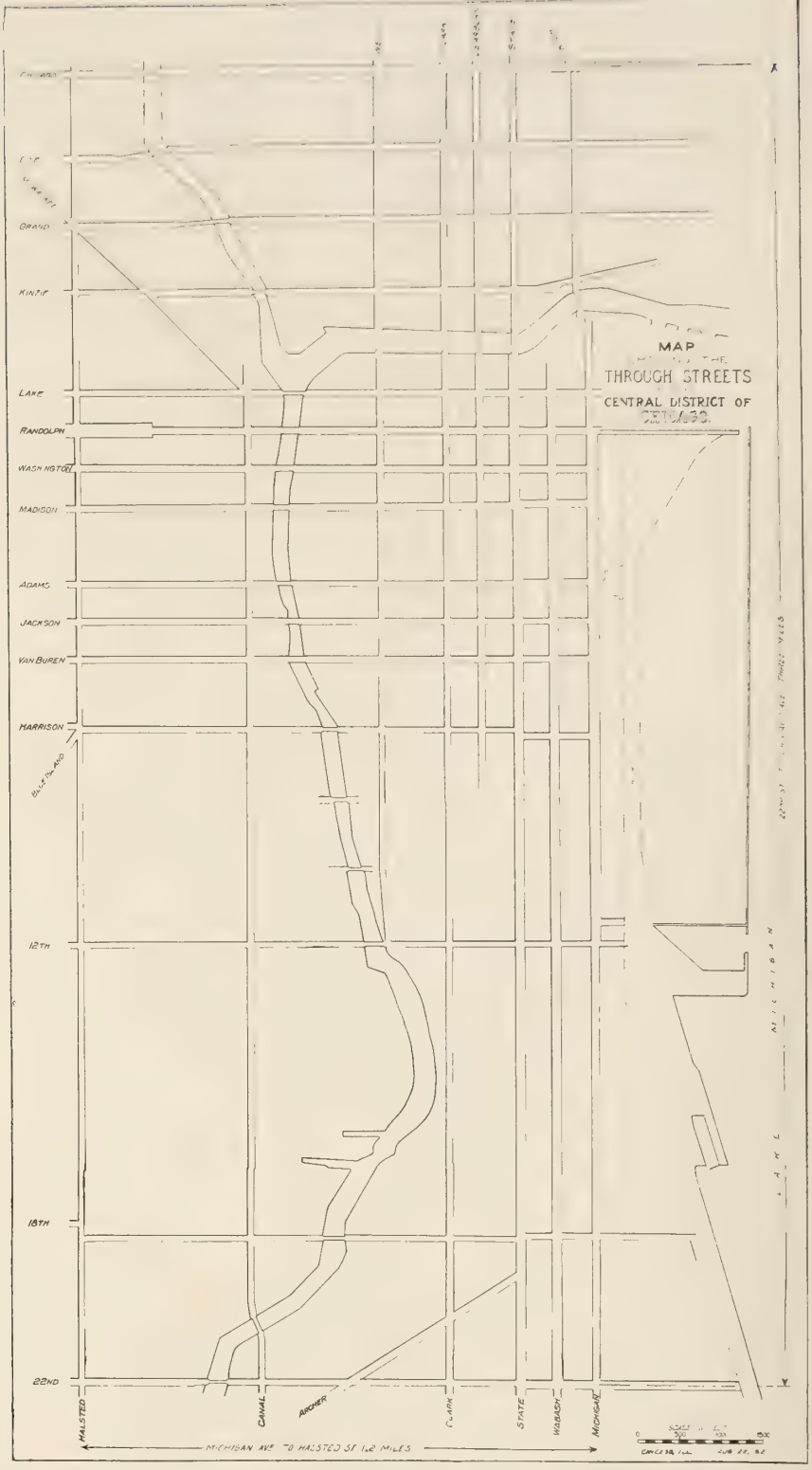


PLATE 45.. MAP SHOWING THROUGH STREETS IN THE CENTRAL DISTRICT OF CHICAGO, 1912. (CHARLES K. MOHLER.)

Terminal wall reduces number of through streets.

The business district, as shown above, extends one and one-fifth miles east and west, by three miles north and south.

This district should normally have, from Halsted street to Michigan boulevard, fourteen north and south through streets. It should have, from 22nd street to Chicago avenue, thirty-six east and west through streets. It has five—or the equivalent of five — north and south through streets, and has fourteen east and west through streets.

The district has a total of nineteen through streets where it should have fifty. It lacks thirty-one—chiefly because of the terminal wall.

PLATE 46. LAND AT SOUTHWEST CORNER OF CANAL AND POLK STREETS, 1913.

The terminal wall depreciates the next zone.

Through routes would "put the west side on the map."

For at least a decade the above west side lot has been in the condition shown. It is within half a mile of the General Post Office, but it is isolated by the intervening "terminal area."

If the district between the river and Halsted street could be put in convenient and quick communication with other parts of the city by fast steam through routes—with stops, say, at two or three places along Canal street—that district would promptly show new business life. It is accessibility that makes land values.

PLATE 47. WHERE RAILROAD AND BUSINESS PROPERTY MEET. LOOKING NORTH FROM TWELFTH STREET, EAST OF FIFTH AVENUE. (ARNOLD RAILROAD TERMINAL REPORT, 1913.)

The terminal wall barricades expansion.

The band of railroad terminal property (*page* 42) stops the lateral growth of Chicago's business center and forces buildings there high into the air.

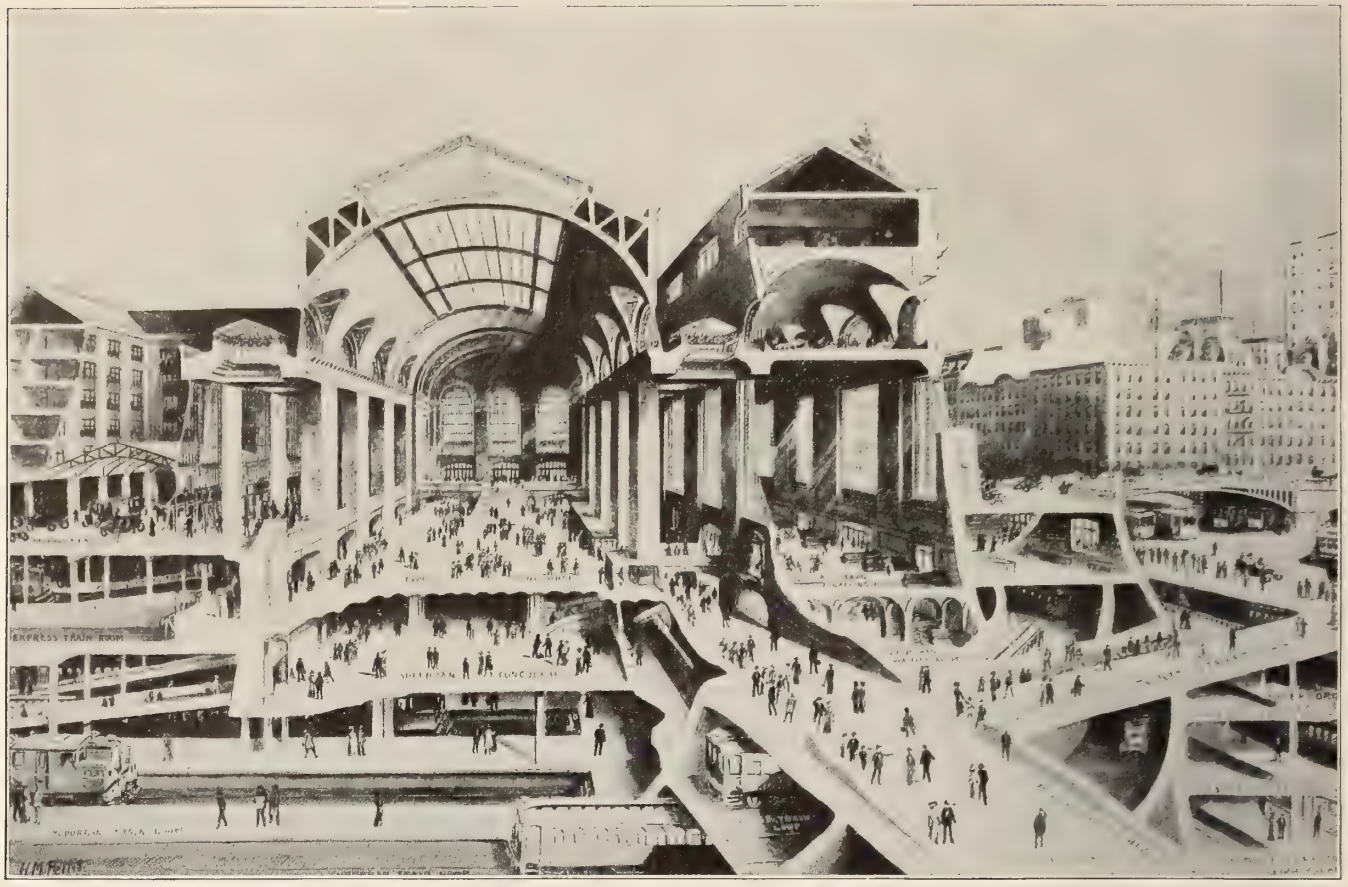


PLATE 48. SECTION OF GRAND CENTRAL TERMINAL, NEW YORK.

Terminals impede passengers.

The new mammoth railroad terminals of today are in themselves so complex and tremendous in size that they become a sort of barrier between the passenger and his train.

"In such a station as the South Station in Boston, it is necessary for a person purchasing a ticket and checking baggage to walk approximately 1,100 feet from the main entrance before entering an express train, and in the Grand Central Station in New York about the same distance; in the new Chicago & Northwestern Station, Chicago, about 940 feet plus a 20-foot stair climb; in the Union Station at Washington about 1,200 feet, and in the Pennsylvania Station at New York from 480 to 950 feet, according to the entrance used." (*W. Symmes Richardson, Scribner's Magazine, October, 1912.*)

PLATE 49. TERMINAL OF CHICAGO & NORTHWESTERN RAILROAD, CHICAGO.

Terminals too costly for use.

The new steam terminals which have been recently erected in various places, and whose cost is given in terms of "scores" or "hundreds" of millions, are largely a form of competitive advertising—for which the public must pay—and are really too expensive to be afforded by their users.

"The fixed charges, taxes and operating expenses of one of the largest terminals for each train run in or out of it are nine dollars and nine cents; for another eleven dollars and fifty-five cents, for still another fourteen dollars and thirty-five cents, and for a fourth eighteen dollars and forty-five cents." (*Samuel O. Dunn, in Scribner's Magazine, October,* 1912.)

The addition of these charges for suburban trains would make the prices of tickets prohibitive to many commuters.

PLATE 50. RUSH OF PASSENGERS AT MANHATTAN END OF BROOKLYN BRIDGE.

A horrible example.

The most notorious example in the world of a terminal is the Manhattan end of the Brooklyn Bridge. To that single point passengers for all the important street car and "Elevated" lines of Brooklyn must go to take their cars. The jam there is a regular daily event.

If those cars also traversed various parts of Manhattan Island, passengers would get aboard at many points instead of one, to their great convenience and to the relief of sidewalks and street crossings between those points and the bridge.

Through routes increase number and length of possible rides.

The question was recently asked in public—as if it disposed of the entire through-route proposition—"Why should we have a through route from Evanston to Gary? How many would want to take that ride?"

It is true that comparatively few passengers would take the ride from end to end of such a north-south through route. Many, however, would wish to make trips, in all sorts of combinations, between the various north side stations and the various south side stations—trips which could not be taken under terminal routing—and the total of such interchange would constitute, not a negligible, but a very large volume of traffic.

The increase secured in the number and length of possible rides by connecting two terminal routes into one through route, is illustrated by the following diagrams:

PLATE 51.

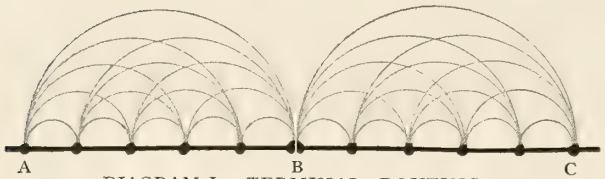


DIAGRAM I. TERMINAL ROUTING:
30 DIFFERENT POSSIBLE RIDES.

Diagram I represents two railway routes extending from opposite sides, A and C, of a given city, to downtown terminals meeting at B. Diagram II represents these two terminal routes as connected at B into a through route AC. Black dots on these routes indicate stations, and trains are presumed to run from end to end of each route, stopping at all stations.

The semi-circles above each route, connecting its stations in various combinations, serve to count the number of different possible trips which could be taken from one station to another, without change, on that route. The terminal route AB (Diagram I) would thus, as appears from a count of its semi-circles, afford 15 different possible trips without change, and the terminal route BC, the same number, or a total of 30 on the two terminal routes.

If, however, these two terminal routes were connected at B into one through route AC (Diagram II), not only could all trips possible on the two terminal routes be then taken, but nearly as many more could also be taken without change, because a passenger at any station from A to B could then ride direct to any station from B to C —which he could not do under terminal routing. The one through route would thus afford 55 different possible trips, without change, as

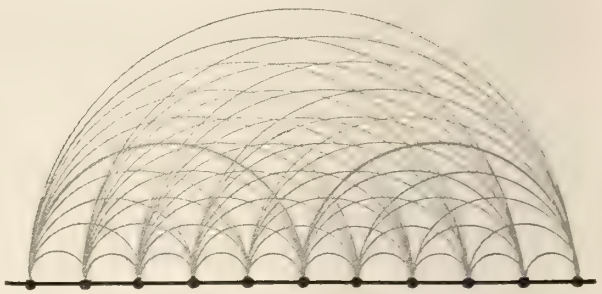


DIAGRAM II. THROUGH ROUTING:
55 DIFFERENT POSSIBLE RIDES.

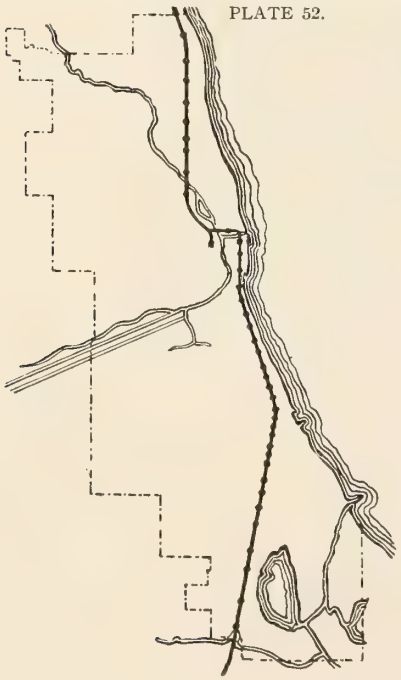
against the 30 by the two terminal routes—an increase of 83⅓%. This increase is shown by the number of those semi-circles in Diagram II, which extend above the two heavy semi-circles, and connect stations from A to B with stations from B to C.

The increased opportunities would of course be available also in the opposite direction.

The average length of possible rides—as is obvious from the diagrams—would also be greatly increased by through-routing. The total number of possible rides by the through route would average 70% longer than those by the two terminal routes, and the additional rides made possible by the through route would average 157% longer than those by the two terminal routes. For actual routes these percentages of increase would of course vary with the number of stations and the distances between them, but in every case they would be substantial.

Through routing would thus make the steam lines available to the local passenger, not only for traffic to and within the more central portion of the city, but for the long rides from one side of town to another.

PLATE 52.



A concrete illustration.

The small plan at the left shows the Chicago & Northwestern (Evanston) line and the Illinois Central line linked together as they might be into a through route.

The Evanston line has, within the city of Chicago, 10 stations. Passengers can make 45 different trips, each without change, between these stations. The Illinois Central line has, within the city, 28 stations. Passengers can make 378 trips, without change, between these stations. On the two terminal routes, therefore, passengers have the option of 423 different trips, without change.

If, however, these two terminal routes were linked together into one through route, passengers could then have the option of 703 such trips, an increase of 280 trips, or 66%. While, too, the 423 trips would average 5.6 miles, the 703 would average 8.7 miles, or 55% more, and the 280 would average 13.4 miles, or 140% more.

The increases in number and length would be still more striking if Northwestern stations outside the city were included in the computations.

CHAPTER VI.

STEAM LINE THROUGH ROUTES IN OPERATION OR PROPOSED ELSEWHERE.

THROUGH routes have been widely adopted on the street railway lines of many or most cities, not merely because of their operating and financial advantages, but because of the ease with which these lines, owing to their occupancy of the streets, could be physically connected through the central districts of these cities.

The extreme physical difficulties of creating *steam line through routes* in the great cities of the world, owing to the lack of any available channels for them in the central areas of those cities, have in most cases prevented their establishment. Despite these difficulties, however, such routes have in several notable instances been established, others are being established at the present time, and still others have been recommended.

In Chicago the physical obstacles encountered elsewhere to steam line through routes are minimized by the great number of steam railroad rights-of-way throughout the city, and especially by the large area of railroad property in the business district. The physical situation in Chicago is thus peculiarly favorable for the establishment of through steam routes

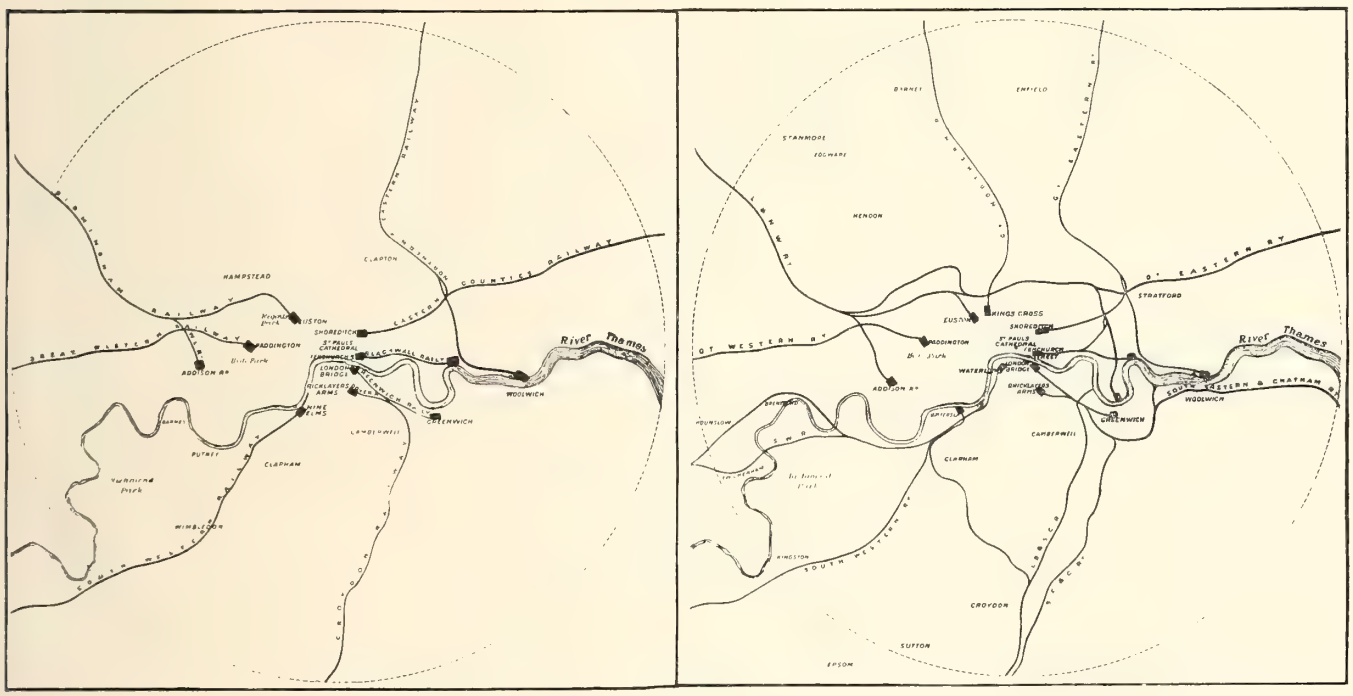


PLATE 53. MAP OF LONDON STEAM RAILROADS, 1845. MAP OF LONDON STEAM RAILROADS, 1860.

SCALE: 1 INCH = 8 MILES.

Through routes could not find room in London.

The first great city entered by steam railways was London. They pressed their way as far into the town as possible, and where they were obliged to halt, there the terminals arose.

The desirability of connecting these railways through the city was realized, even though their future importance for local travel was not then appreciated. A Royal Commission was accordingly appointed in 1846 to advise whether such connection should be made. The Royal Commission said, "No," and considering the almost insuperable difficulties in the way of finding or carving channels for steam railroads through the heart of this great historic capital, their decision is not surprising.

In 1860, therefore, all steam lines into London still ended at terminals scattered through the city's middle zone.

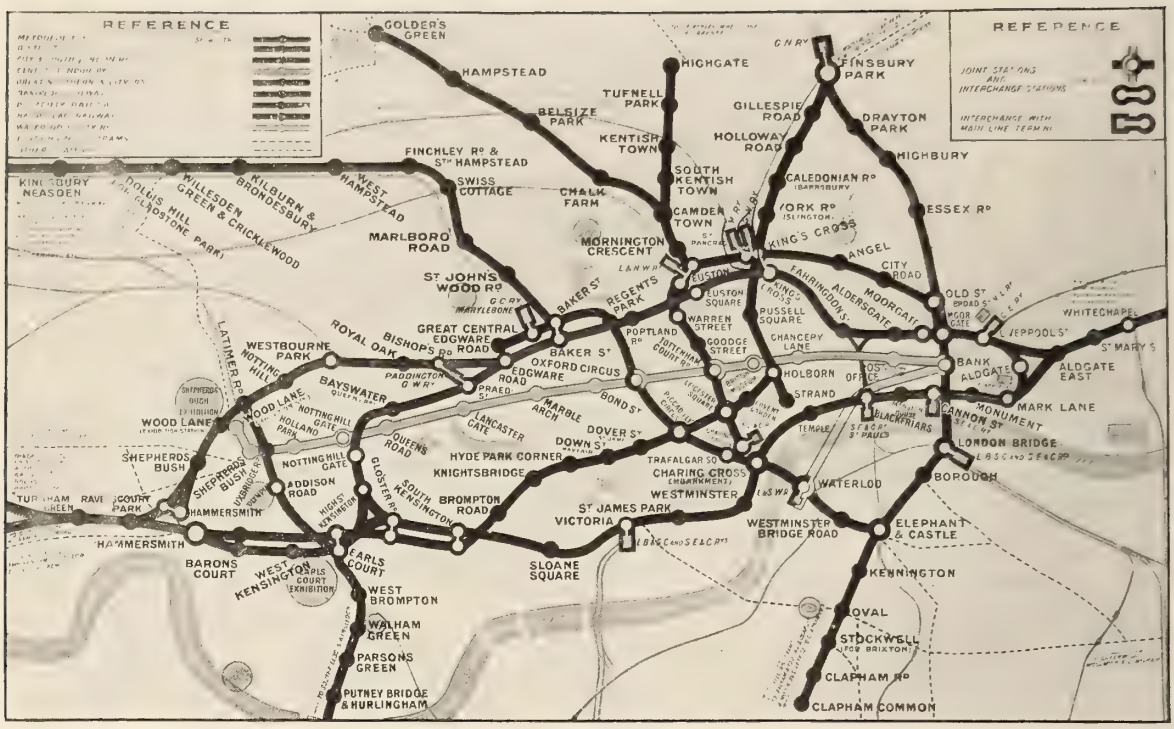


PLATE 54. MAP OF LONDON UNDERGROUND ELECTRIC RAILWAYS, 1910.

SCALE: 1 INCH = 2 MILES.

Terminals mean subways.

If the steam lines must end, however, at awkward points—distant from ½ mile to 4 miles from each other—and thus prove only a crippled means of local travel, passengers must still get across and about London somehow. The first subways of the world were, therefore, begun there about 1860, and London's great underground network has been slowly, and at great expense, developing ever since. With its disorder, waning popularity and financial failure, it is a conspicuous example of a colossal and unsatisfactory makeshift in modern urban development.

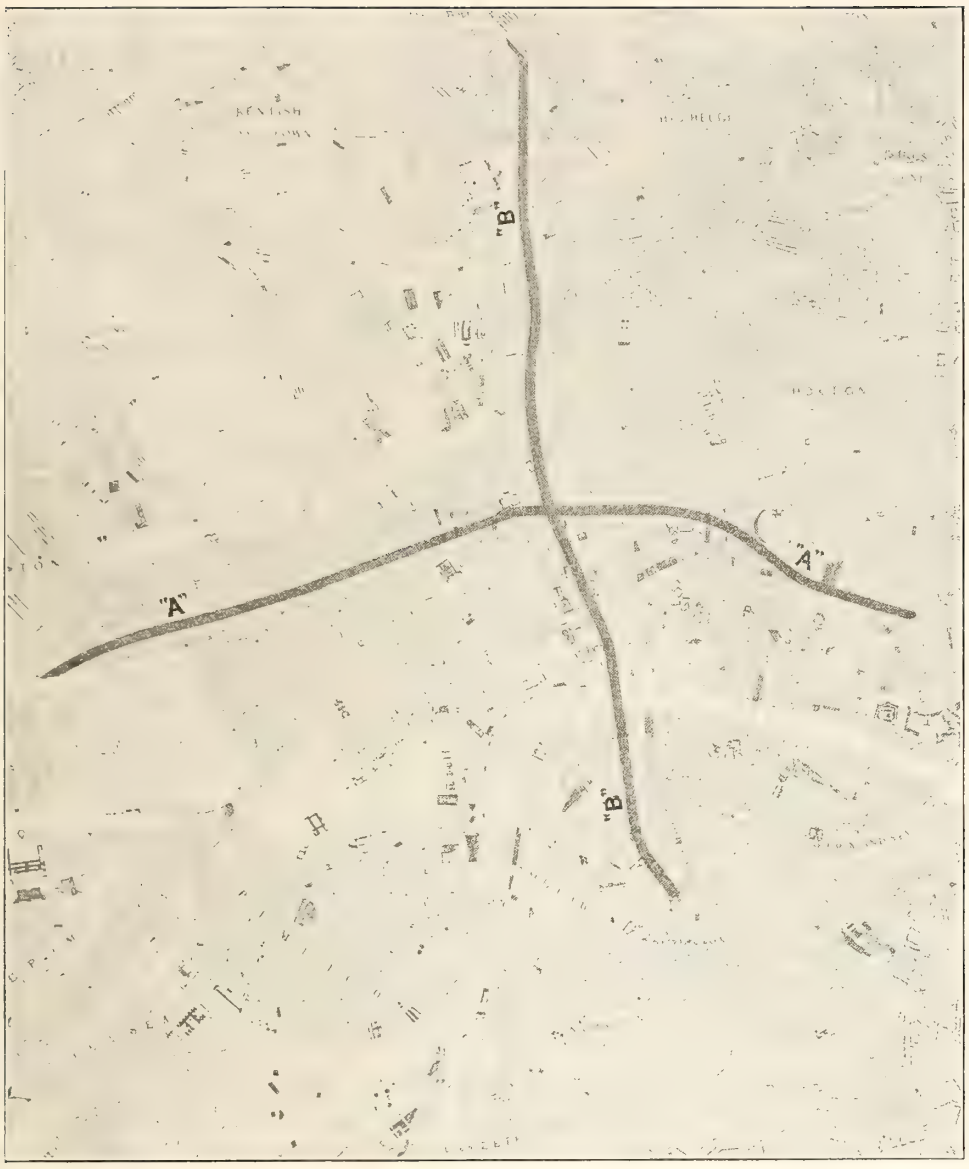


PLATE 55. MAP OF STREET-AND-RAILROAD ARTERIES SUGGESTED FOR LONDON BY ROYAL COMMISSION ON LONDON TRAFFIC, 1905.

SCALE: 1 INCH=1 MILE.

London needs through steam routes.

London has, for a portion of its steam line service, reached a sort of half-way through-route plan, by connecting some of its main steam lines with its subways, and thus running many trains, both long-distance and suburban, well into or across the central area of the city, making repeated stops in that area. This highly beneficial plan, however, has proved insufficient, and the great metropolis still needs the through routing of its steam lines in a consistent and comprehensive manner.

The Royal Commission on London Traffic, reporting in 1905, declared that the only plan which would really meet traffic demands would be to carve two great axial avenues, one east and west, the other north and south, through the heart of London, each 5 miles long and 140 feet wide, with two levels, the lower for carrying the steam railroads (electrified) through London, and the upper for tram cars and ordinary street traffic. The difficulties are such that these avenues have not been constructed, but the need for them, or some equivalent improvement, is plain and urgent.

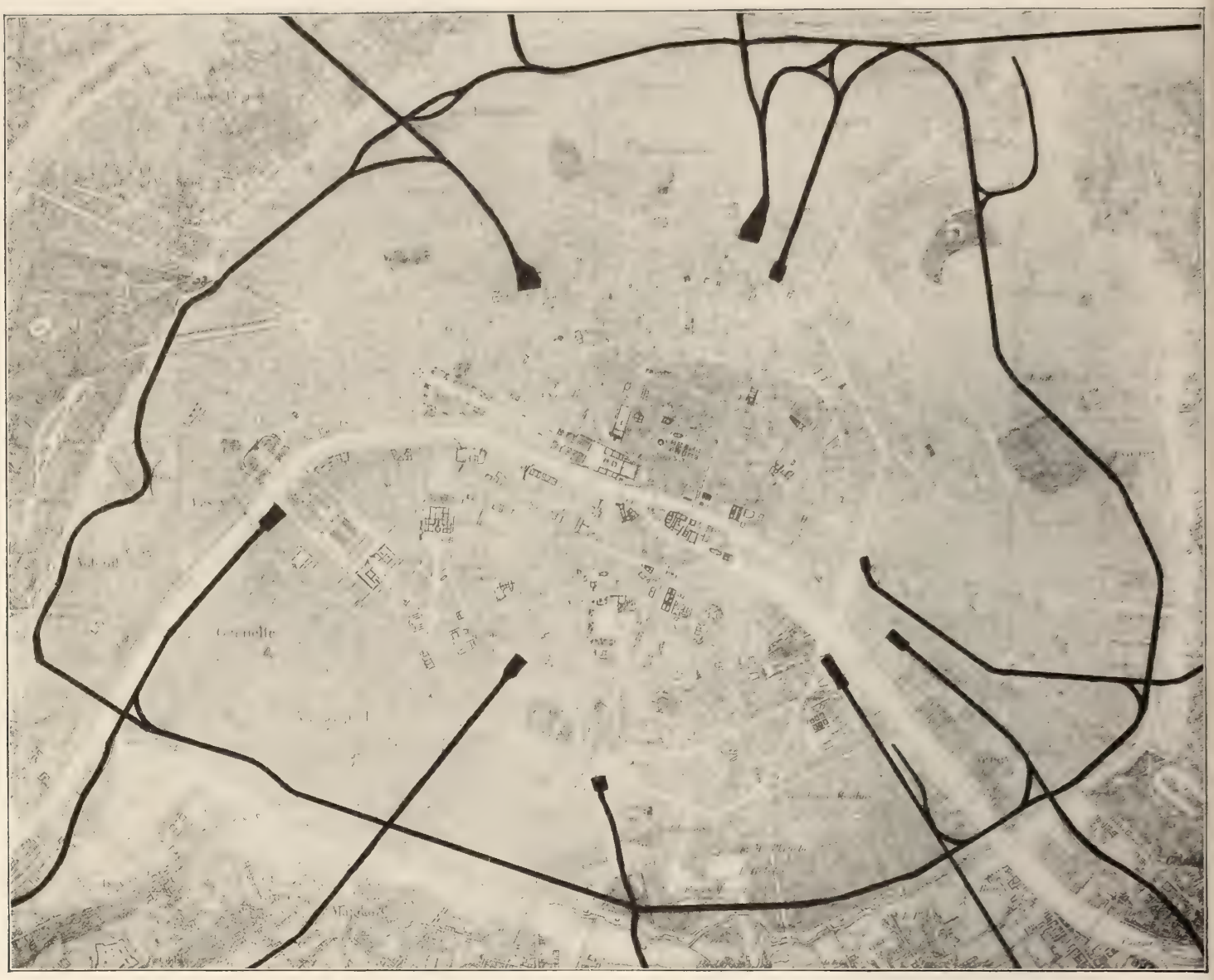


PLATE 56. MAP OF PARIS STEAM RAILROADS, 1898.
SCALE: 1 INCH = 1 MILE.

Through routes could not find room in Paris.

The historical development of steam railroads in Paris was similar to that in London In 1898, the various lines ended in numerous terminals scattered through the middle zone of the city. There was "no room" to push the lines through this ancient and compact capital, and the terminals remain.

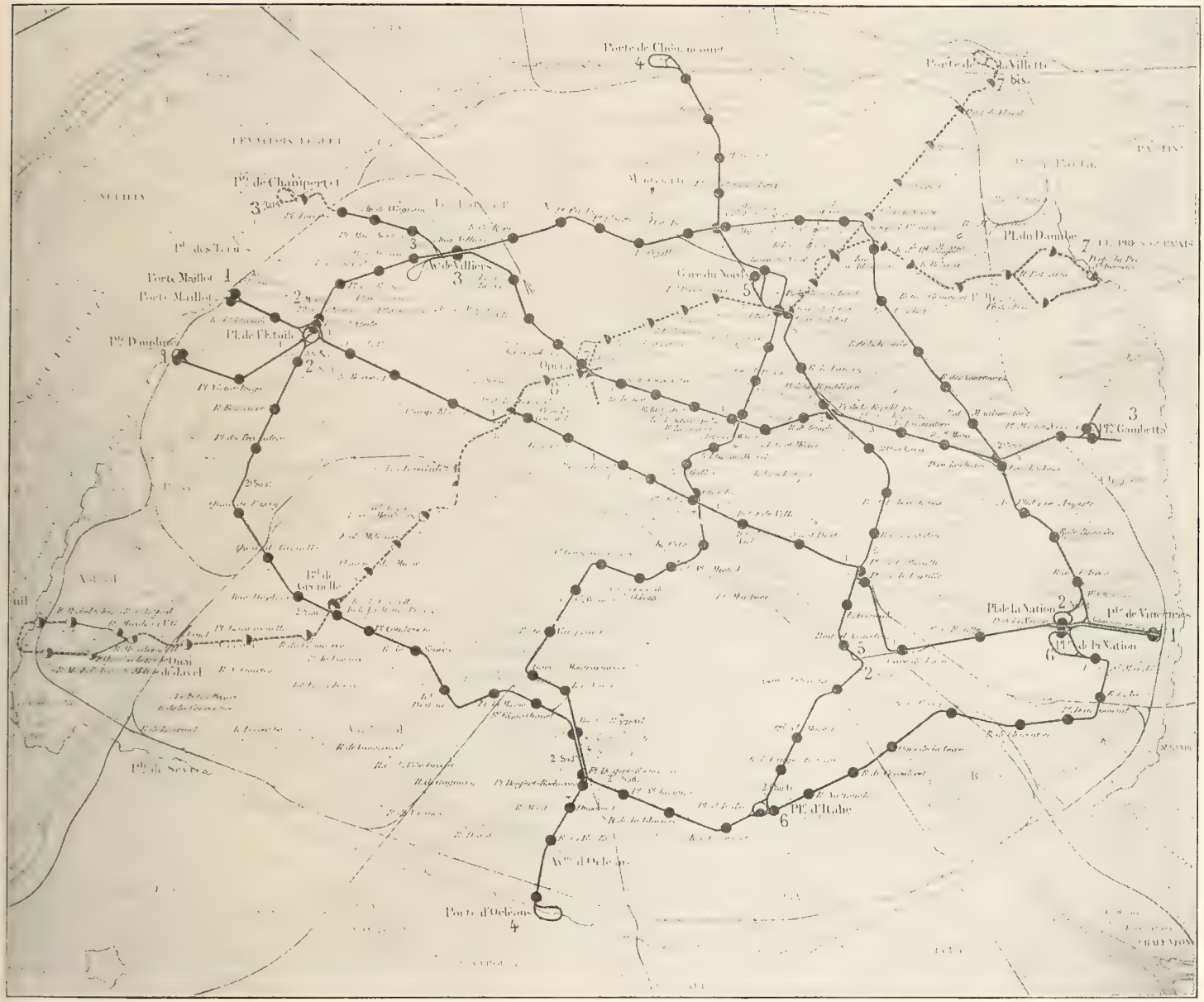


PLATE 57. MAP OF PARIS UNDERGROUND ELECTRIC RAILWAYS, 1913.

SCALE: 1 INCH = 1 MILE.

———Existing lines .....Under construction

Paris terminals mean Paris subways.

Passengers must, however, get across and about Paris. And since the steam lines did not enable them to do so—the steam terminals being distant from ¼ mile to 4 miles from each other—the "Metropolitan," or underground railway, was authorized in 1898, and is now operated as here shown.

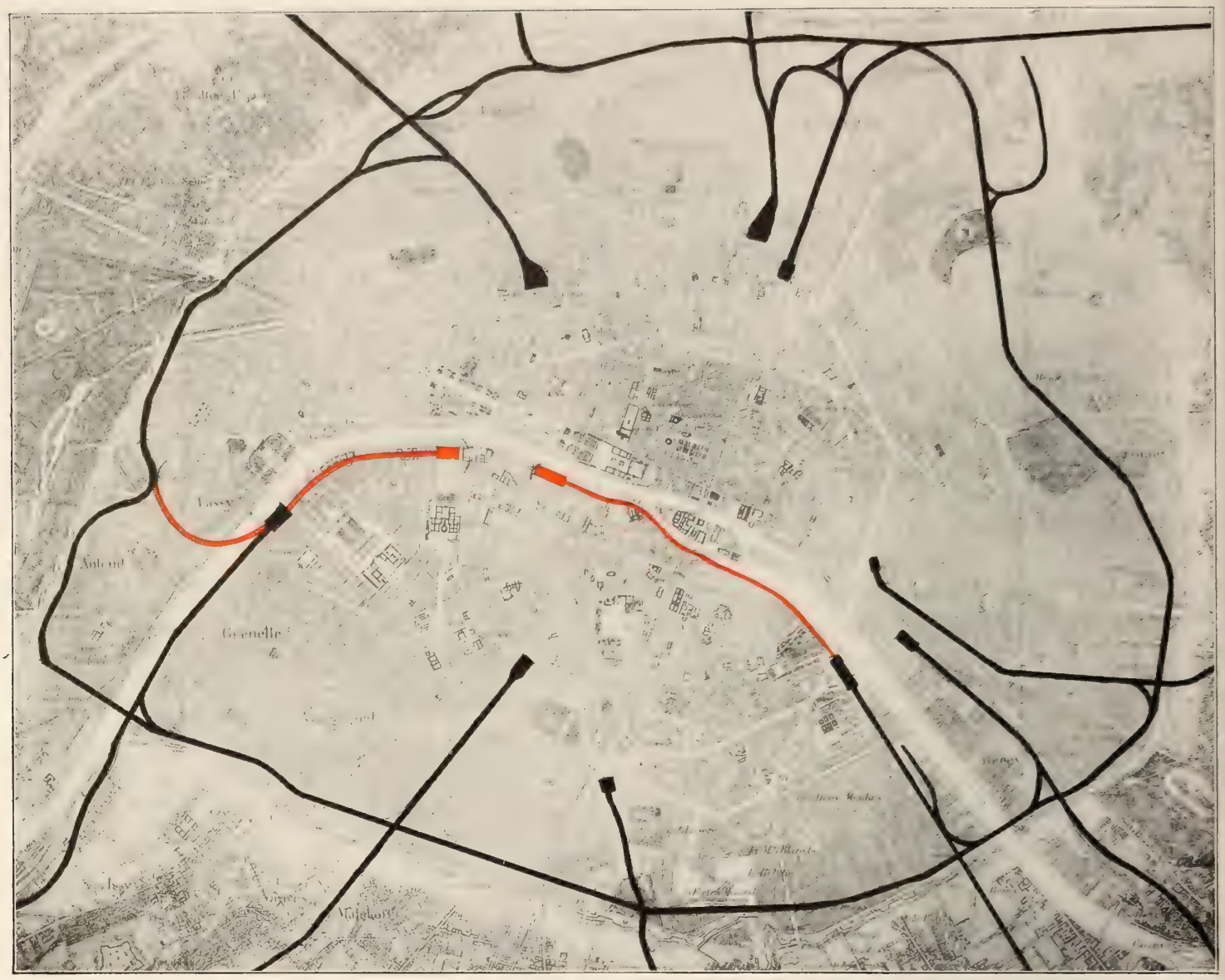


PLATE 58. STEAM RAILROAD MAP OF PARIS SHOWING, IN RED, TWO STEAM LINES EXTENDED (ELECTRIFIED) INTO INTERIOR OF THE CITY. 1900.

SCALE: 1 INCH = 1 MILE.

Paris takes steps toward through routes.

Paris believes in bringing the most efficient means of travel into the very heart of the city, where the need is greatest, rather than in pushing these means farther toward the outskirts.

When Paris was getting ready for its World's Fair of 1900, the important Orleans steam line, from the southeast, was extended two miles further into the city to a new station. Another line was at the same time extended 1½ miles further in from the west. This was an approach toward the through-route principle for the main railways. Although no room could be found to put this principle into real and general effect, yet sufficient room was found in this instance for a substantial approach toward its proper application.

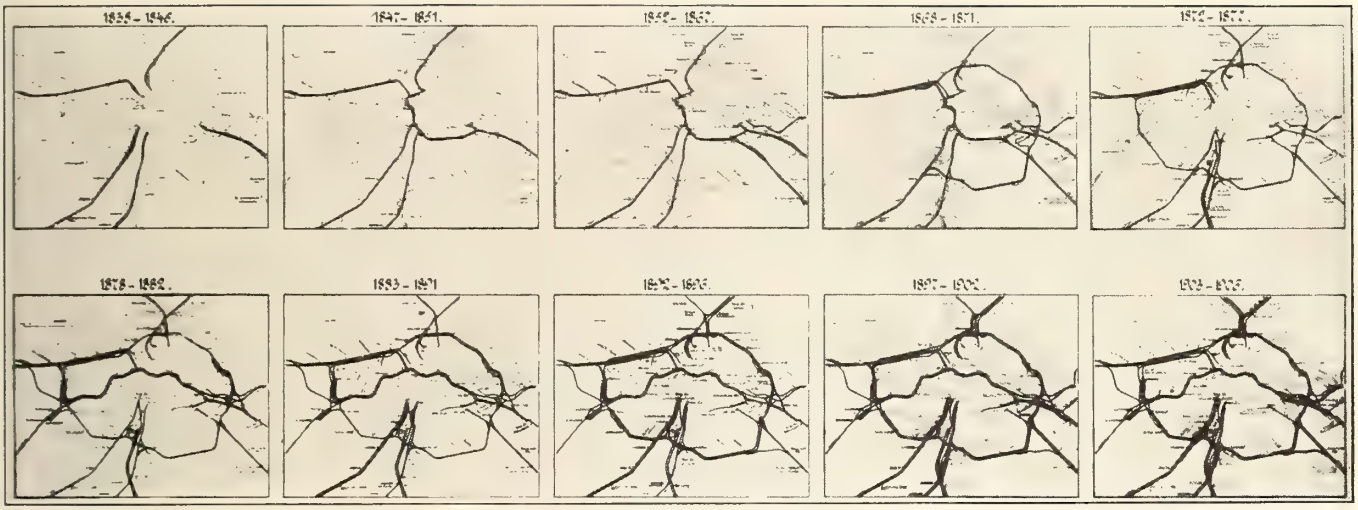


PLATE 59. PLANS SHOWING HISTORICAL DEVELOPMENT OF STEAM RAILROADS OF BERLIN, 1838-1906.
(INTERNATIONAL CITY PLANNING EXHIBITION, BERLIN, 1910.)
SCALE: 1 INCH = 9 MILES.

Berlin pioneers through routes.

A different story from that of London and Paris is told by Berlin. In 1845, the steam railroads of that city ended in terminals, as shown in the first of the upper row of small plans. The desirability of connecting these various lines was realized, and in 1847 they were connected, as shown in the next small plan. But the connection was laid through the city streets and was more and more objected to, until finally, in 1872, as shown in the last plan of the upper row, it was torn up, leaving the lines ending again in their respective terminals.

Still this condition was unsatisfactory, and so, in 1882, as shown in the first plan of the lower row, there was completed—partly by using a river bank—the four-track 7-mile *Stadtbahn,* a link running directly through the heart of Berlin on embankments and arches, and connecting the local and long distance lines from the east with those from the west.

PLATE 60. PLAN OF STEAM RAILROADS OF BERLIN.

SCALE: 1 INCH = 1½ MILES.

SHOWING:

In Black—The RINGBAHN, or belt railway, 5 to 8 miles across and roughly encircling the city, its north half being known as the Nord-Ring and its south half as the Süd-Ring.

Other steam railways entering Berlin from different directions and crossing the Ringbahn to various terminals.

In Red—The STADTBAHN (an east-west diameter of the Ringbahn) and its connections to the north and south halves of the Ringbahn, and to local and long distance lines to the east and to the west.

In Pink Tint—The business district of Berlin.

How Berlin's through route operates.

The Berlin Stadtbahn serves as the trunk, not only for long distance passenger service from the east and the west, but also for a ramifying local passenger service for city and suburbs.

Two of the four tracks of the Stadtbahn serve for local trains, some of which fan out upon suburban routes to the east and the west, while others run around the north ring or the south ring. The other two tracks are used to some extent for this local service, but they serve mainly for long distance trains in both directions.

Trains for local passenger service stop at each of the 13 stations (see *page* 58) on this Stadtbahn, or link, and long distance trains stop at five of them. Long distance trains desired to run through Berlin can do so. Long distance trains originating in Berlin, and destined westward, start from a coach yard on the east side of the city and stop at each of the 5 stations; those destined eastward reverse this movement.

There are thus no switch-back train movements or stored cars except at outlying coach yards and the station tracks for waiting trains are reduced to a minimum.

PLATE 61. STATION AT ALEXANDERPLATZ—BERLIN STADTBAHN.

Berlin's through-route stations unobstructive but efficient.

For the success of steam through routes it is essential that they, or more specifically their stations, should be centrally located.

Through-route stations are free of switch-back train movements and so of the extra trackage required therefor. They also need only a minimum of trackage for waiting trains. Their width is thus so reduced that they can be placed at central locations without serious impairment to the public streets.

The above illustration shows a through-route station on the Stadtbahn in the heart of Berlin. It is a comparatively inexpensive structure, and is so narrow that it is not a serious obstruction to the development of the city or to the streets crossed. Show windows and trade extend along the sidewalk of the street under the viaduct. Yet this station accommodates about the same number of passengers, long distance and local combined, as does the new Chicago & Northwestern terminal. The enormous train shed and train yard of the Chicago & Northwestern terminal, shown on *page* 40, are typical of terminal operation. Nor should it be forgotten that the public pays for those mammoth structures.

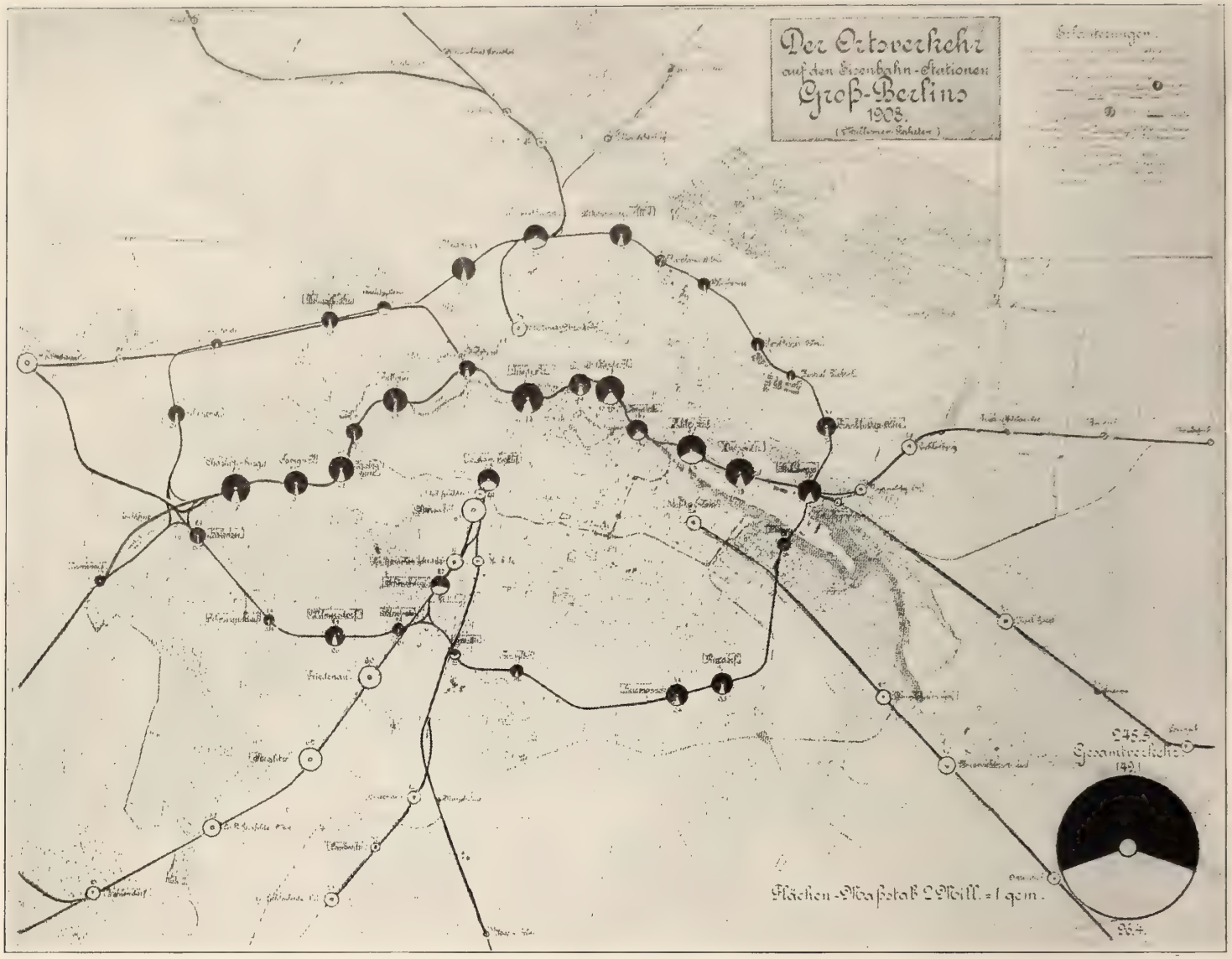


PLATE 62. PLAN SHOWING BERLIN STEAM LINES, AND, BY WHITE-AND-BLACK DISKS, THE VOLUME AND DESTINATION OF LOCAL PASSENGER TRAFFIC AT EACH STATION OF THE STADTBAHN AND THE RINGBAHN.

Berlin's through route develops city as well as suburban passenger traffic.

The black segments of the disks at the stations of the Stadtbahn and Ringbahn, on the above plan, show the proportion of the passengers taking trains at these stations, destined for other stations on these lines, and the white segments the proportion destined for the stations on the more remote or suburban lines. A comparison between the black segments and the white segments shows that the Stadtbahn—and the same is true of the Ringbahn—provides local passenger service, not alone for the suburbs, but still more conspicuously for the city proper and its immediate environs—an area, within or near the Ringbahn, roughly six by nine miles across.

This area is small compared to that of Chicago—which extends 26 miles north and south and 5 to 9 miles east and west. The fact that these Berlin steam lines develop such an important intensive traffic within so limited an area, is suggestive of the inner city passenger traffic which the steam lines of Chicago might develop, once they were similarly linked up into a system the trunk factors of which passed through the business district and provided reasonably frequent stations.

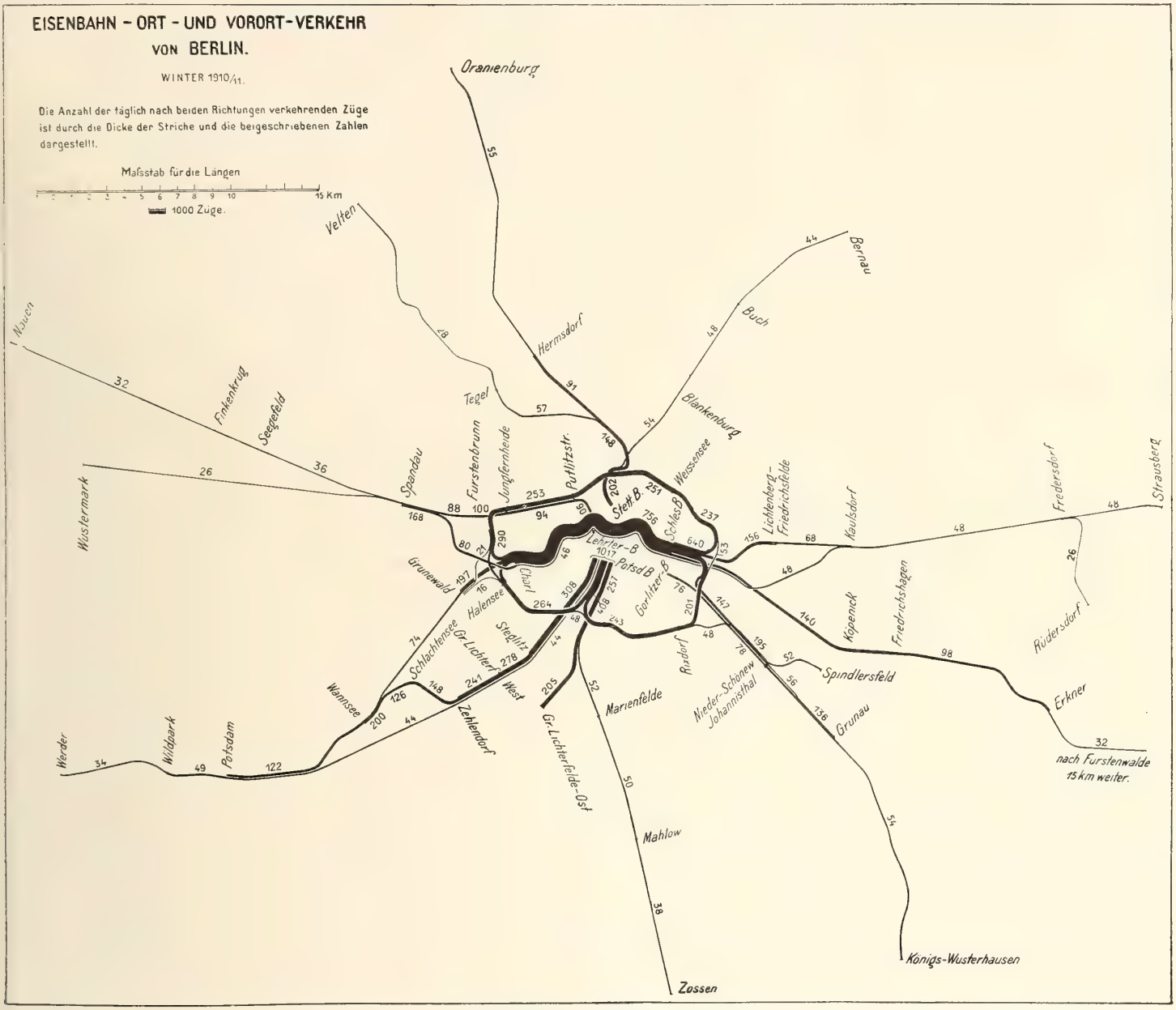


PLATE 63. PLAN SHOWING VOLUME OF LOCAL PASSENGER FLOW ON DIFFERENT ROUTES OF BERLIN STEAM RAILWAYS.
(RICHARD PETERSEN, 1911.)
The relative number of trains on each line is indicated by the relative width of the line; the figures indicate the number of trains daily.

Berlin's through route exceeds all Chicago's terminal routes.

The above plan shows the Stadtbahn as Berlin's great passenger highway.

In 1912, the local passengers taking trains at the 13 stations of the Stadtbahn numbered 104,000,000, and the local passengers taking trains at all the stations of the steam lines of Greater Berlin numbered 387,000,000 (*Gross Berlin Statistische Monatsbereichte, 1912.*) For the same year the number of local passengers on the steam lines of Greater Chicago was approximately 41,500,000 (see *page* 15).

In other words, the 7-mile long, 4-track Berlin Stadtbahn received approximately 2½ times as many local passengers, and the entire steam network in Greater Berlin received over eight times as many local passengers, as did all the steam lines in Greater Chicago.

The chief reason for this contrast is shown in the above map, and particularly in the wide black east-west line measuring the enormous traffic of Berlin's great through route. The Stadtbahn, traversing the city from side to side through the business section, has not only touched at numerous points the chief areas in need of high grade travel, but by its various outer connections it has put to work, for local passenger service, a large portion of the general network of Berlin's steam lines.

It should also be noted that this development of local passenger traffic on steam lines has taken place in the city which has the best tramway system in Europe.

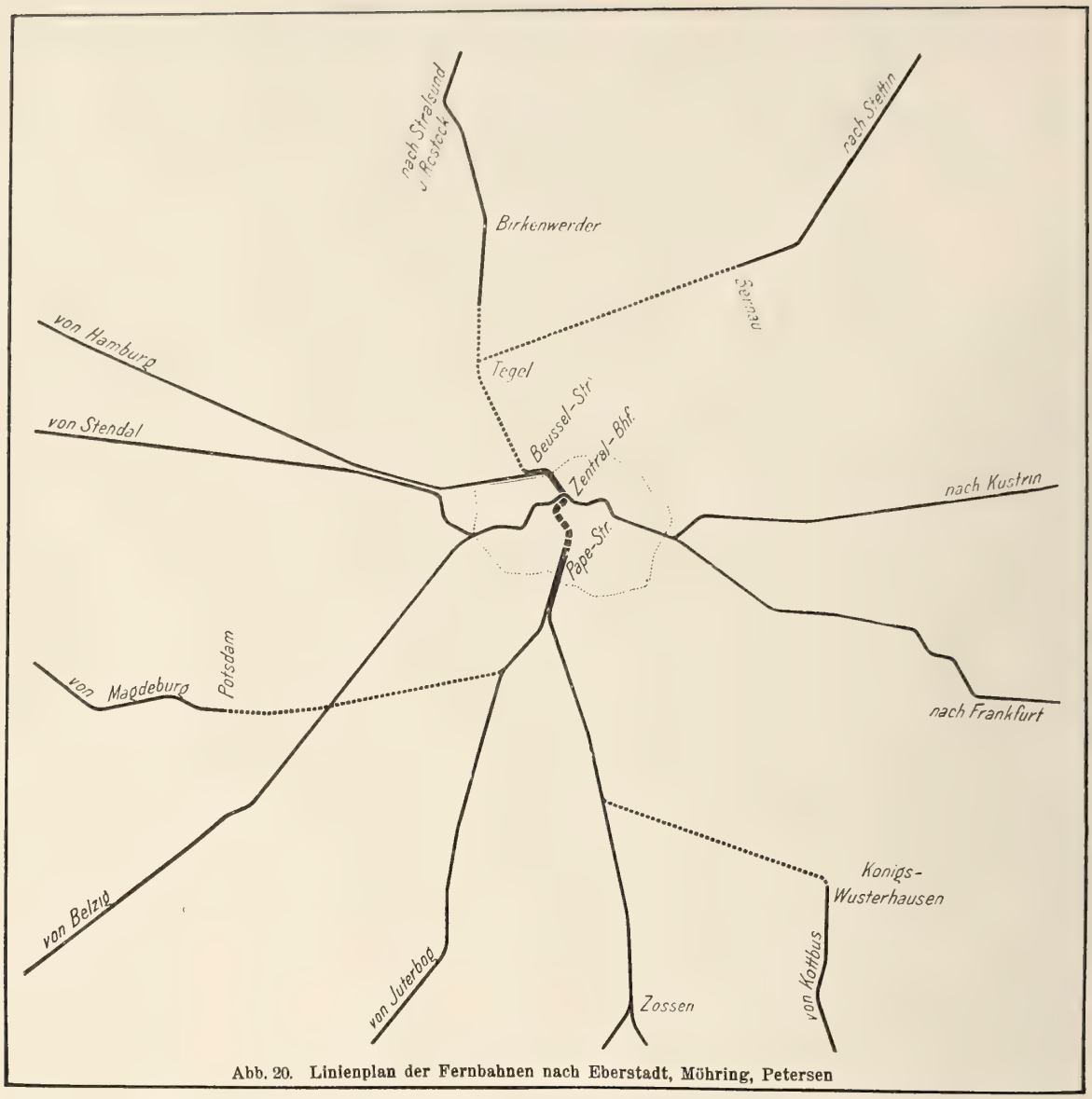


Abb. 20. **Linienplan der Fernbahnen nach Eberstadt, Möhring, Petersen**

PLATE 64. PROPOSED THROUGH-ROUTE PLAN FOR LONG DISTANCE PASSENGER RAILROADS OF BERLIN.

SCALE: 1 INCH = 7 MILES.

Complete through routing for Berlin's long distance travel recommended.

The plan on *page* 56 shows how, in Berlin, the steam lines from the north and the south still end in terminals. This is recognized as a defect; and in the official prize competition of 1909 for plans for the improvement of Greater Berlin, three of the four prize plans proposed through-route connections between the steam lines from the north and those from the south.

A complete through-route scheme, as shown above, for long distance traffic is recommended in one of the most interesting of these plans, the proposed north-south connection being indicated by the heavy dotted line at the center of the plan. The scheme provides for operating long distance trains through the city where this is desired, and for running all other long distance trains, by forward movement, through the central part of the city, to coach yards on the outskirts beyond.

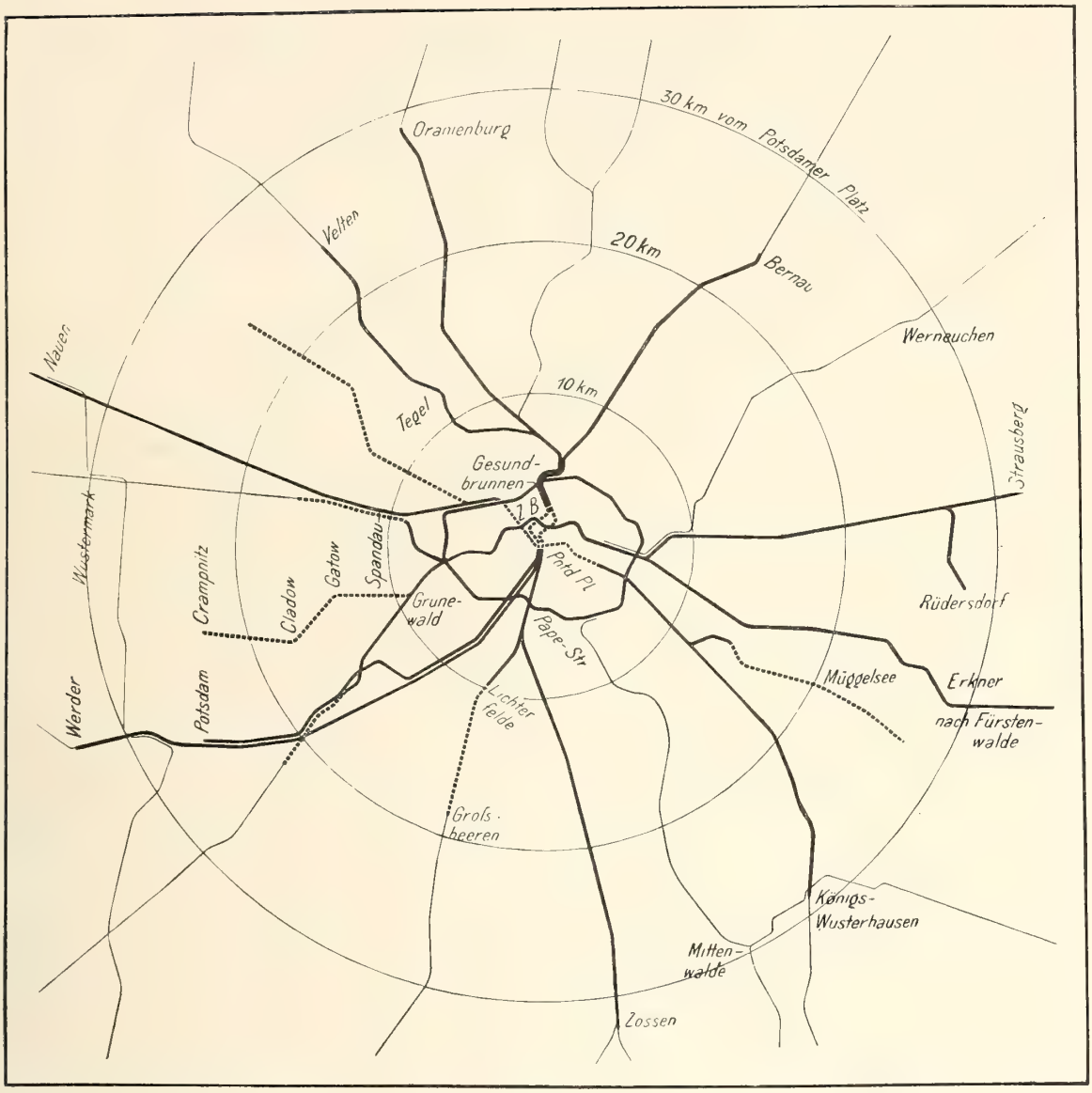


PLATE 65. PROPOSED THROUGH-ROUTE PLAN FOR LOCAL PASSENGER RAILROADS OF GREATER BERLIN. (EBERSTADT, MÖHRING, PETERSEN.)

SCALE: 1 INCH = 7 MILES.

Complete through routing for Berlin's local travel recommended.

The same prize plan which proposed a complete through-route scheme for Berlin's long distance steam travel, proposed also a complete through-route scheme for Berlin's local steam travel. This scheme would for local service employ extra tracks alongside the long distance tracks, and adjacent or branch lines would be added as required, so as to secure in the course of years a comprehensive, and presumably electrified, high speed system extending 20 miles in all directions from the center of the city.

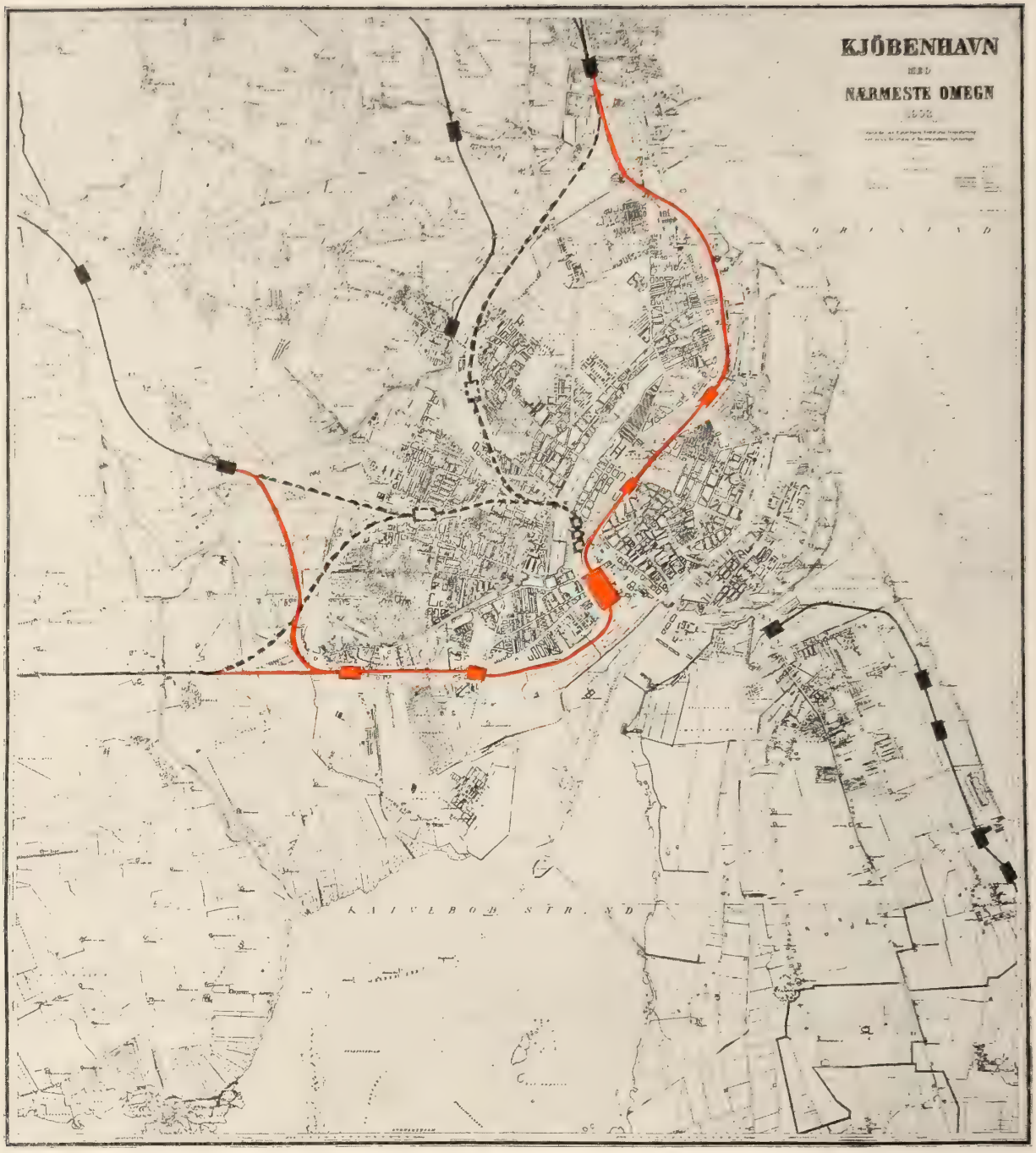


PLATE 66. MAP OF COPENHAGEN, SHOWING, (a) ABANDONED STEAM TERMINAL LINES; (b) SUBSTITUTED THROUGH-ROUTE SYSTEM NEARING COMPLETION, 1913.

SCALE: 1 INCH = 2.4 MILES.

Old lines to be given up. Old lines to be kept. New lines.

Copenhagen builds through route for steam lines.

A radical reconstruction of the steam railway network of Copenhagen is being completed after ten years' work upon it. The old terminal routes (dotted black lines) and station have been abandoned, and a new (red lines) through-route system has been substituted.

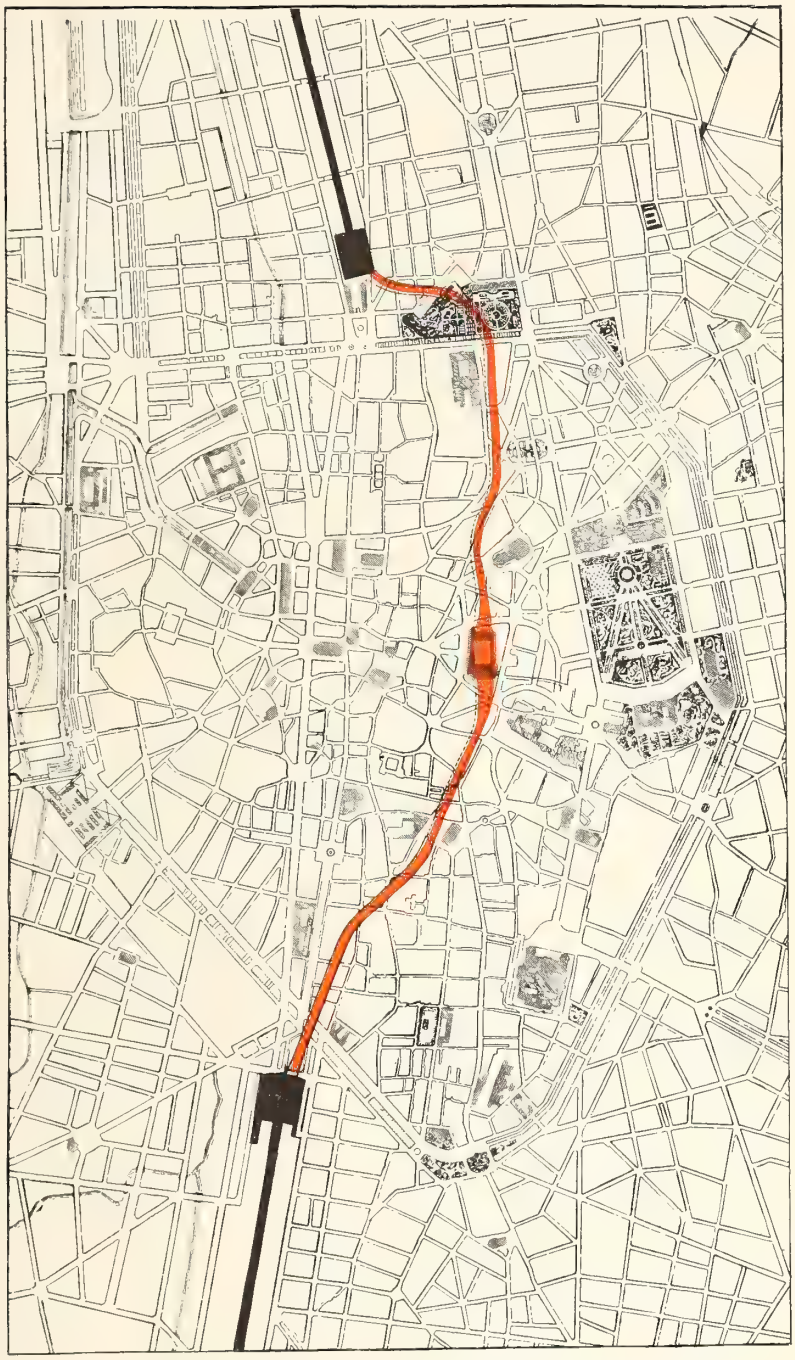


PLATE 67. MAP SHOWING THE TWO EXISTING STEAM TERMINALS (BLACK) IN BRUSSELS, AND THE TUNNEL CONNECTION TO BE BUILT FOR THROUGH-ROUTE OPERATION (RED).

SCALE: 2¾ INCHES = 1 MILE.

Brussels builds through route for steam lines.

At present the steam railroad lines of Brussels are grouped in two terminals on opposite sides of the city. These lines are now to be connected for through-route operation, as indicated in the above plan, with an additional station midway in the link. Work has begun.

Vienna, Hamburg and Stockholm are among European cities which have carried out, or are projecting, important schemes for through routes on their steam lines, and for the development on those routes of an intensive local passenger traffic.

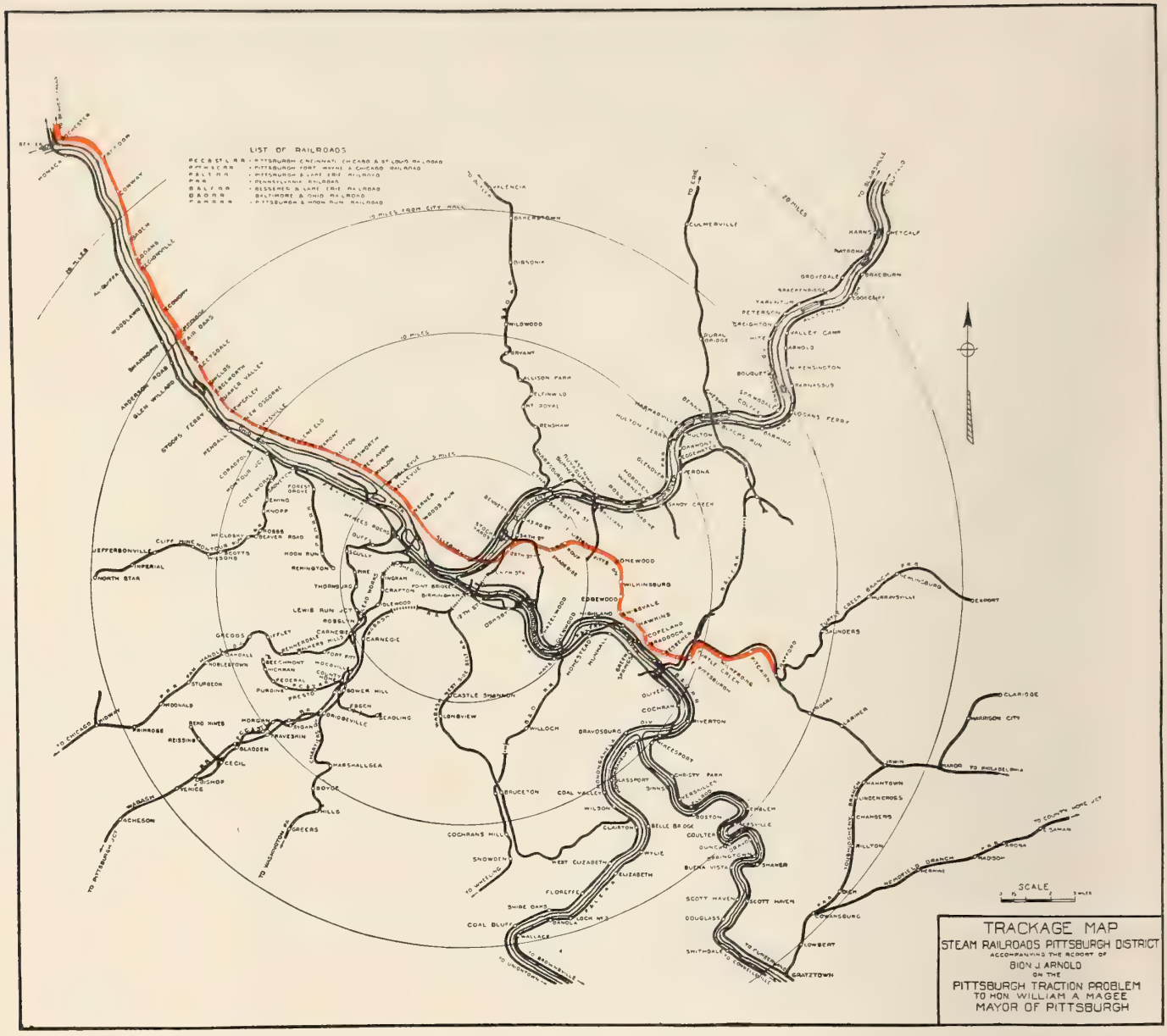


PLATE 68. THROUGH ROUTE (RED) AT PITTSBURGH: PENNSYLVANIA RAILROAD SYSTEM.

Pittsburgh has steam through route.

The Pennsylvania Railroad Company has for four or five years been operating a through route from Trafford, about 17 miles southeast of Pittsburgh, to and through its main Pittsburgh station, to Beaver Falls, about 25 miles northwest. Formerly this stretch was divided at the Pittsburgh station into two separate routes.

This through route has proven popular.

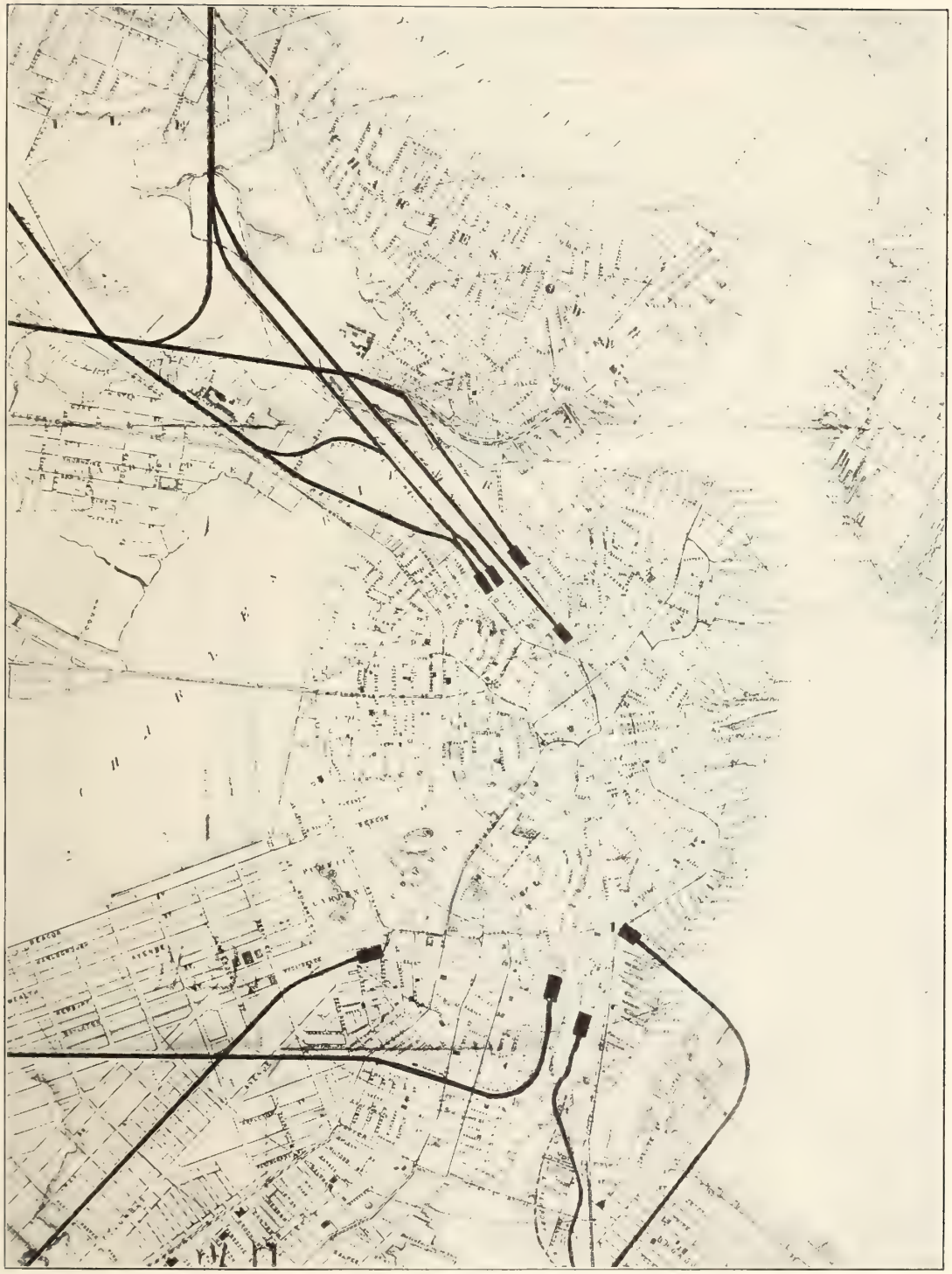


PLATE 69. STEAM RAILROAD MAP OF BOSTON, 1865.
SCALE: 2¾ INCHES = 1 MILE.

Boston's early terminal routes.

In 1865, Boston had eight passenger terminals, planted at different points in the city, as shown above.

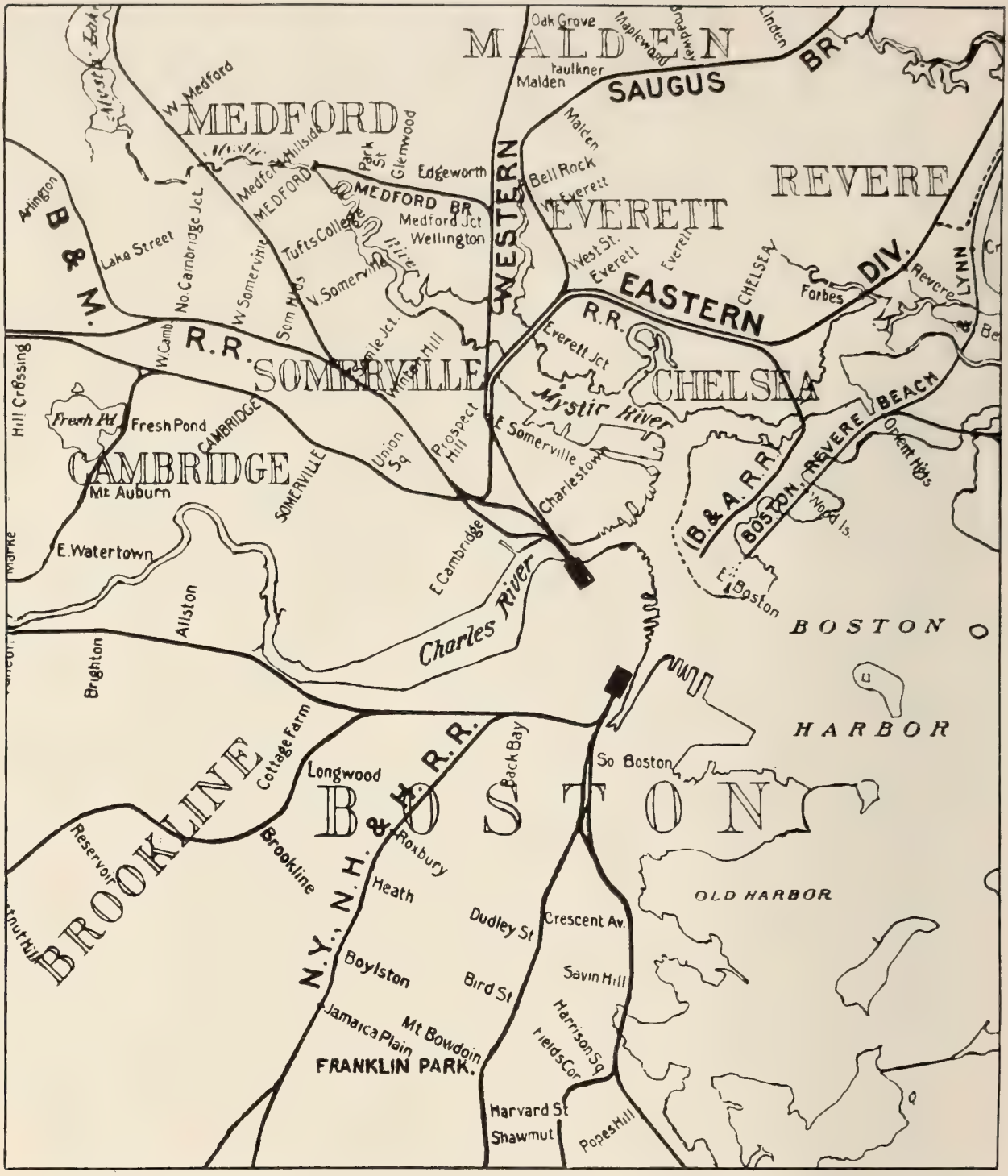


PLATE 70. PLAN SHOWING BOSTON'S STEAM RAILROADS GROUPED IN TWO TERMINALS, 1898.
SCALE: 1 INCH = 1.6 MILES.

Boston's movement toward through routes for steam lines.

About 1898, all the steam roads entering the north half of Boston had been concentrated into the North Union terminal, and all those entering the south half into the South Union terminal.

The final step logically demanded to complete this development is obvious, and, as appears on the opposite page, has been officially proposed.

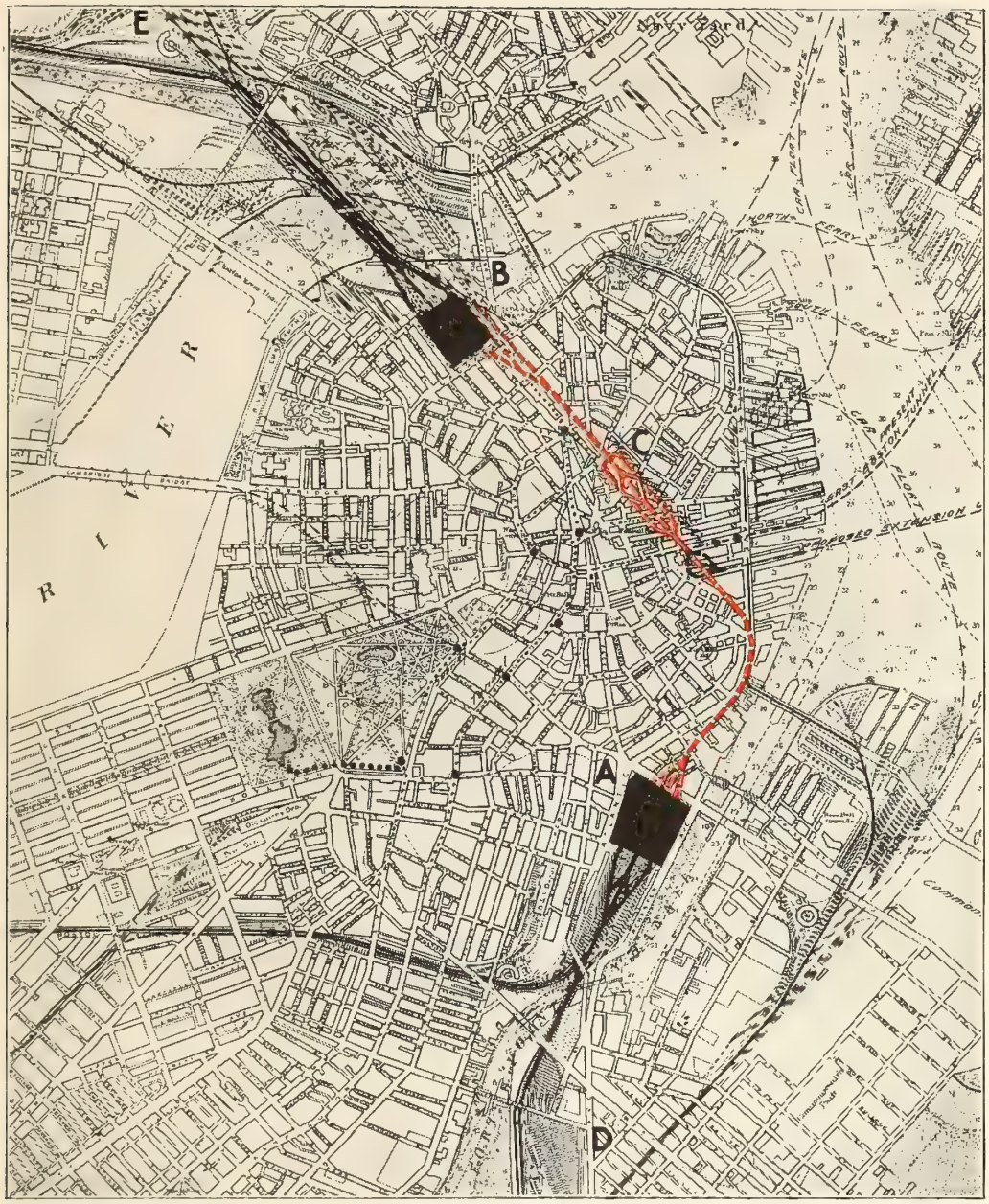


PLATE 71. PLAN SHOWING (RED) FOUR-TRACK TUNNEL LINK RECOMMENDED BY THE BOSTON METROPOLITAN IMPROVEMENTS COMMISSION TO CONNECT THE RAILROADS OF THE TWO TERMINALS. 1909.
SCALE: 2½ INCHES = 1 MILE.

Boston commission recommends through routes for steam lines.

The Boston Metropolitan Improvements Commission recommended (1909) that the lines of the North Union terminal should be connected with those of the South Union terminal, by a 4-track subway running through the heart of old Boston and having a new station near the middle point of the link.

The Commission further recommended an interchange of coach yards between the Boston & Maine system, and the New Haven & Hartford system, according to the Berlin plan, so that trains originating in Boston destined for the north or northwest, would start from a coach yard on the opposite side of town and stop at each of the three stations, and trains originating in Boston destined for the south or west would reverse the process. Long distance trains could also, where desired, run directly through the city. The scheme would be especially convenient for local passengers, since local trains would be through-routed and stop at the three downtown stations.

The financial and engineering difficulties in the way of this project are obviously very great, but its desirability—which has been approved also from the side of the railroads—would appear to be established.

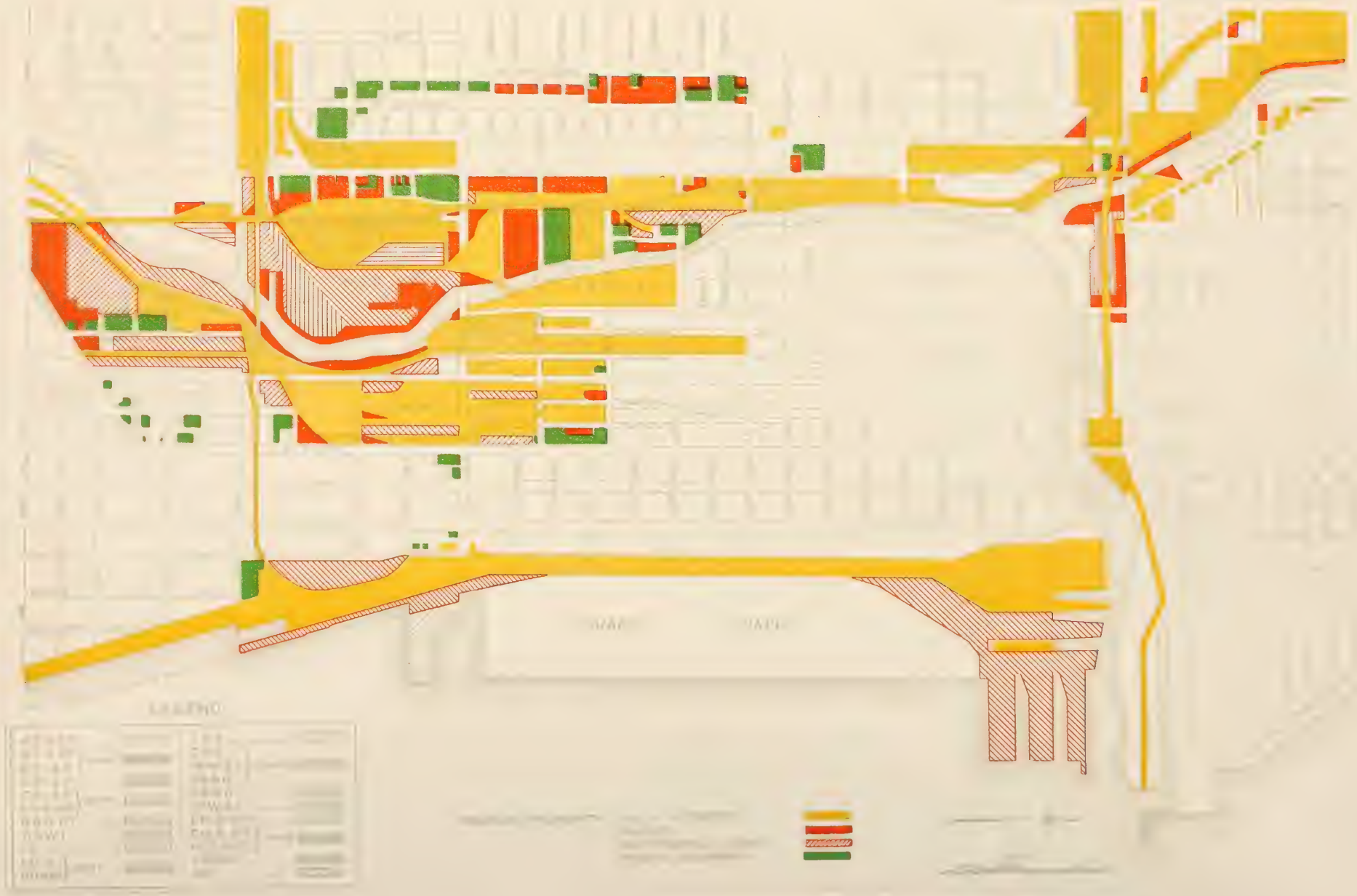


PLATE 72. MAP SHOWING THE AMOUNT, AND EXTENT OF USE, OF RAILROAD PROPERTY IN CHICAGO'S DOWNTOWN AREA.
(RAILROAD TERMINAL REPORT—BION J. ARNOLD, 1913.)

PLATE 73. VIEW OF "BUSINESS DISTRICT" OF CHICAGO, FROM LAKE MICHIGAN ON THE LEFT TO AND ACROSS SOUTH BRANCH OF CHICAGO RIVER ON THE RIGHT; LOOKING SOUTH FROM A POINT NEAR DEARBORN AND POLK STREETS; TOWER OF DEARBORN STREET TERMINAL IN FOREGROUND; TWELFTH STREET VIADUCT IN MIDDLE DISTANCE.

CHAPTER VII.

THROUGH ROUTES PRACTICABLE ON CHICAGO'S STEAM LINES.

EXAMINATION shows that, to a large extent, the factors are already in existence for establishing through routes on the steam lines of Chicago for local passenger service.

Chicago being the one great city born after the invention of the steam locomotive, the railroads secured a share of its central space in its early days. They have also been adding to that share ever since. Chicago's six passenger terminals, therefore, from one or another of which railroads now radiate in all directions, are close to the very heart of the city.

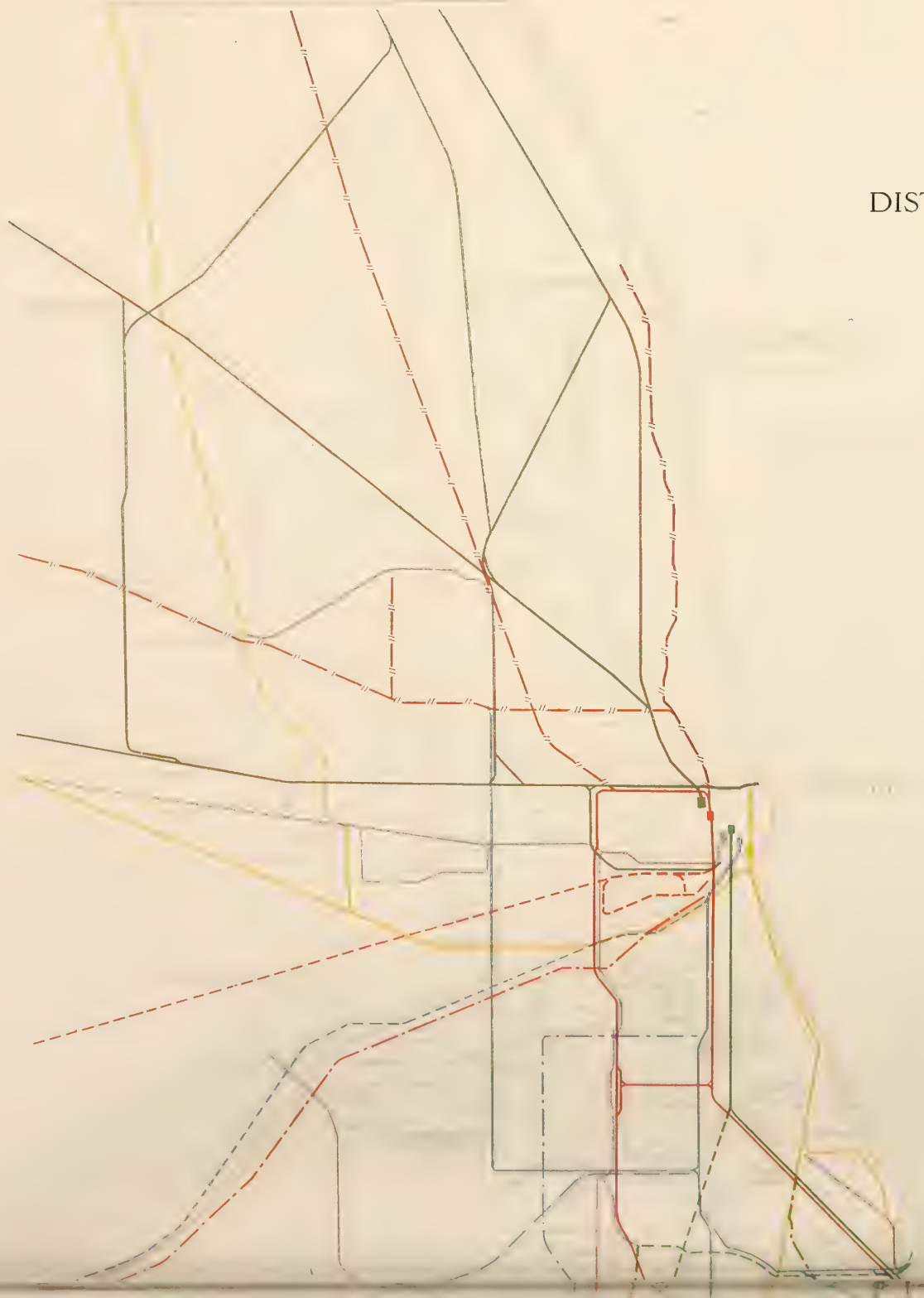
London's passenger terminals lie chiefly around an oval 2 miles by 4 miles across; those of Paris are equally remote from each other, and both cities have solidly improved interiors. On the other hand, five of Chicago's six terminals can be touched in a mile walk, the sixth in a half-mile more, and there are 609 acres of railroad land, only partially utilized, in and around the heart of the city.

In no other great community are the passenger terminals so near together as in Chicago; in no other would their connections be so short; in no other is there so much room for connections.

Through routes would find requisite room in central Chicago.

The exceptional opportunities in Chicago for central connections between steam lines are indicated on the map opposite. It shows, not only the 609 acres of railroad land in or bordering the business district, but it shows that nearly 11% of this is unused, while 22% is only partially used. The above illustration tends to verify the conditions shown on the map.

The requisite space, therefore, for through-route connections in the business area is obviously available.



MAP OF STEAM RAILROADS OF CHICAGO AND VICINITY

DISTINGUISHING BY A PARTICULAR COLOR THE LINES ENTERING EACH OF THE SIX PASSENGER TERMINALS. 1912.

Scale: 1 1 0 1 2 3 4 Miles

EXPLANATION

DEPOTS	LINES.
No 1 CENTRAL STATION	ILLINOIS CENTRAL R.R.
	MICHIGAN CENTRAL R.R.
	M St P & S Ste M. Ry.
	C C C & St L Ry *
No. 2 DEARBORN STATION	C & W I R R
	A T & S F Ry
	G T W Ry
	WABASH R. R.
	ERIE R R.
	C I & L Ry (MONON)
	C & O Ry (C C & L R R.)
No. 3. LA SALLE ST STATION	L S & M S Ry
	C R I & P Ry
	N Y C & St. L R. R
	C & E I R R
	C I & S R R.
No 4 B & O STATION	B & O C. T R. R.
	C G. W R. R.
	PERE MARQUETTE R. R*
No 5 UNION STATION	PENNSYLVANIA LINES
	C & A R R.
	C B & Q R R.
	C M & St P Ry.
No. 6. NORTHWESTERN STATION	C & N W Ry.

* HAVE NO PASSENGER TRACKS. SHOWN.

C. & E. I. R. R. SHOWN ON MAP AS ENTERING LA SALLE STREET STATION, NOW ENTERS DEARBORN STREET STATION.

PLATE 74. (REPRODUCED, WITH MODIFICATIONS, BY COURTESY OF THE CHICAGO ASSOCIATION OF COMMERCE COMMITTEE OF INVESTIGATION ON SMOKE ABATEMENT AND ELECTRIFICATION OF RAILWAY TERMINALS.)

How through routes could be established on Chicago's steam lines.

In general, through steam routes could be formed in Chicago, first, by operating trains on the through-route principle, over lines already physically connected as required for the purpose, and, second, by connecting lines appropriate for through-route operation, but now ending in separate terminals.

The map has six colors, each distinguishing the group of passenger lines entering one of the six passenger terminals of the city. (The seventh color, gray, indicates trackage exclusively for freight.) This map, if studied, will tell of surprising through-route possibilities by each of the two methods described.

Notice, first, the red lines, and observe how a system of through routes, extending widely over Chicago, might be put into operation by simply utilizing for that purpose those red lines—all of which are already in existence and physically connected in the Union Station. These lines are shown by themselves on the next page and their through-route possibilities can there be appreciated more clearly.

Notice, secondly, how near the terminals are to each other, and what short links would serve to join the lines of one terminal with those of another to form through routes. Some of the striking possibilities in this direction are brought out more clearly in the next illustration but one, where certain groups of lines are reproduced and the proximity of their respective terminals to each other is shown.

PLATE 75 MAP SHOWING STEAM RAILROADS ENTERING THE UNION PASSENGER TERMINAL, CHICAGO.

Through routes which could be operated today.

The Union Station group of lines, shown in red on the preceding map, are reproduced above by themselves.

From these lines there could be formed and put into operation at once two great north-south through routes, each traversing the city from end to end, the one nearest the lake passing through the Union Station, and the other roughly paralleling this from three to five miles farther west; also a U-shaped through route from the northwest, through the Union Station, to the southwest.

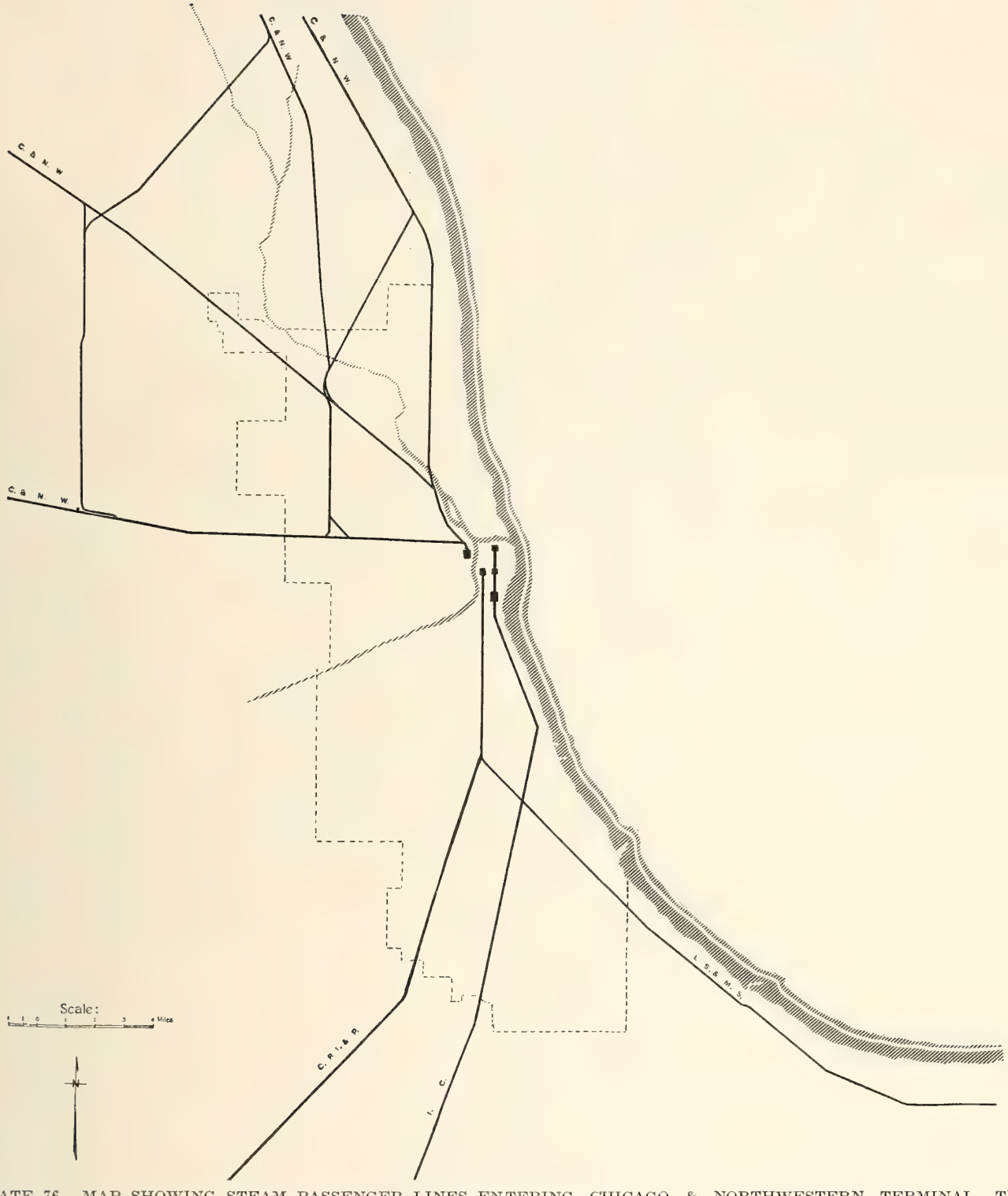


PLATE 76. MAP SHOWING STEAM PASSENGER LINES ENTERING CHICAGO & NORTHWESTERN TERMINAL, THE ILLINOIS CENTRAL TERMINAL (AT RANDOLPH STREET) AND THE LA SALLE STREET TERMINAL.

Through routes which could be established by short links.

The above map shows, in its upper part, the existing system of passenger lines entering the Chicago & Northwestern passenger terminal, and, in its lower half, the existing lines entering the La Salle street terminal and the Illinois Central terminal (at Randolph street). The terminals of these various lines approach so near to each other that the question is at once suggested, why not connect them, so that passengers from the two great divisions of the city represented may use the rapid steam lines for interchange travel? Such use is practically prohibited now by the downtown terminal operation of all these lines.

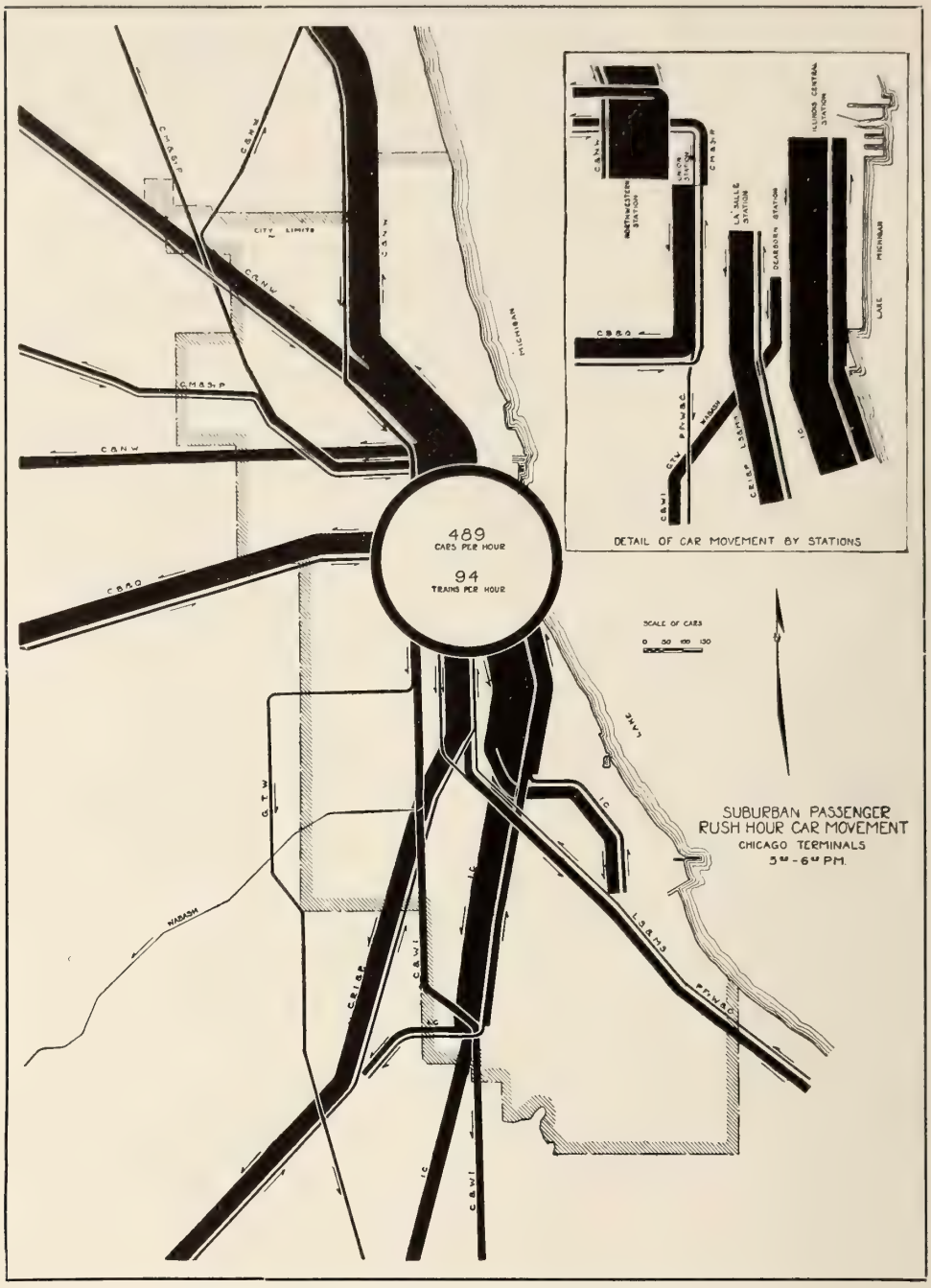


PLATE 77. DIAGRAM SHOWING INBOUND AND OUTBOUND LOCAL PASSENGER CAR FLOW ON THE VARIOUS STEAM LINES OF CHICAGO DURING THE EVENING RUSH HOUR. (ARNOLD RAILROAD TERMINAL REPORT, 1913.)

Through routes adjustable to rush hour traffic.

The above diagram shows the car flow for local travel on the steam lines of Chicago during the evening rush hour. A corresponding flow, in reverse direction, occurs in the morning rush hour. These rush hour pulsations constitute the portions of the day's traffic most difficult to deal with.

With through routes established on the steam lines, a considerable portion of the rush hour trains in the morning could be operated to and through the business district, to coach yards somewhat beyond, and return on their course for the evening rush hour traffic. This method of operation would not only make it possible for trains both in and out to make several stops in the downtown district, but would obviate reverse train movements there.

The existence already of the requisite coach yard capacity for such operation is shown on the next page. (For suggested general scheme of routing, see "Elastic plan of train operation," *page* 81.)

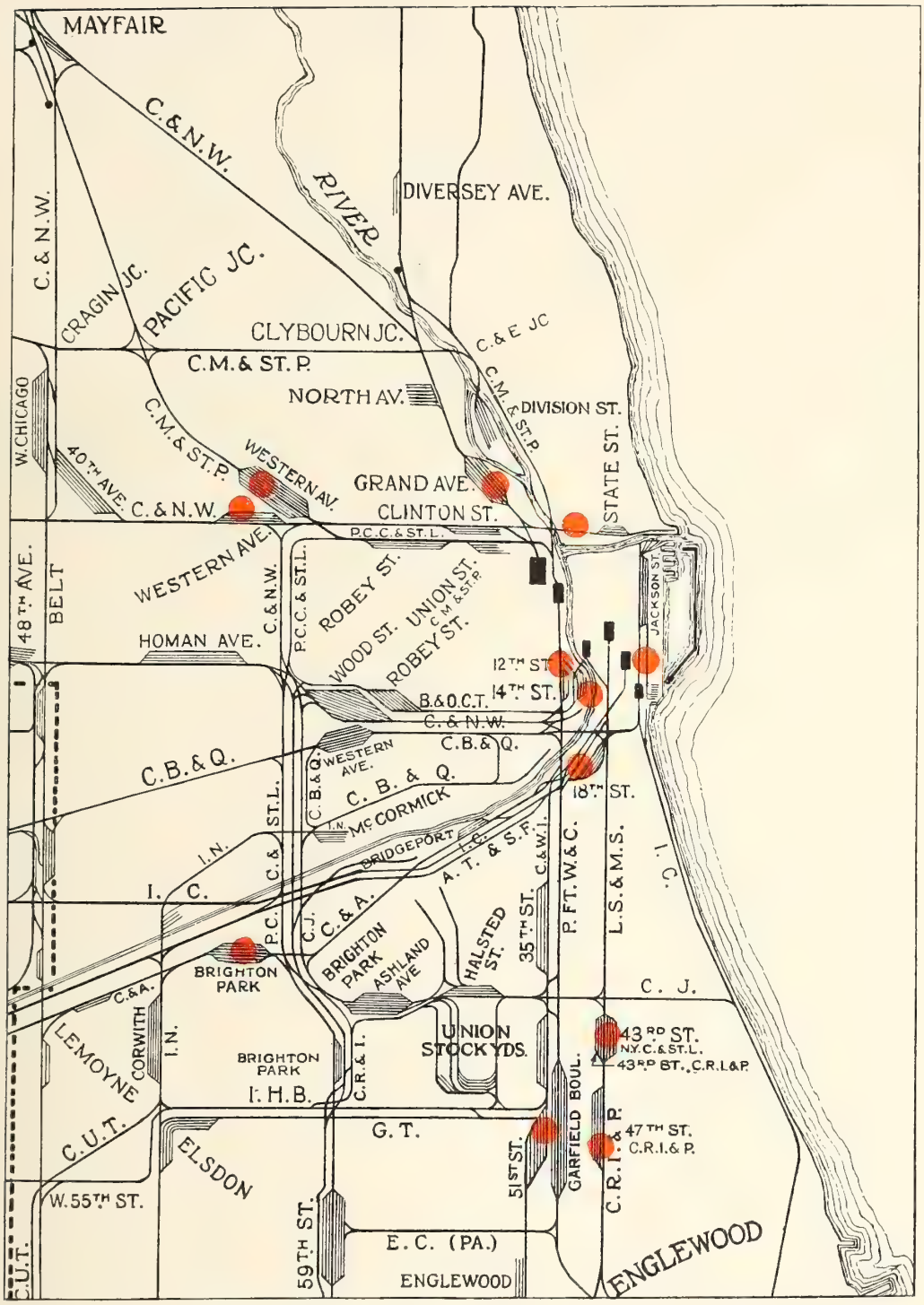


PLATE 78. MAP SHOWING (RED DOTS) LOCATION OF STEAM PASSENGER COACH YARDS IN CHICAGO. 1913. SCALE: 1 INCH = 1.6 MILES.

Through routes would find interchangeable coach yards.

The through-route plan would demand such an interchange of coach yards that trains on any line might proceed through the city, by continuous forward movement, to a coach yard on the far side of the city—according to the plan practised in Berlin and officially recommended for Boston. The above map, giving location of existing coach yards in different parts of Chicago, suggests the feasibility of arranging the requisite interchange. While this plan should be regarded as indispensible for trains for local passenger service, it is also desirable in many ways for long distance trains terminating in Chicago. With this plan installed for both classes of trains, no reverse train movements of any kind would take place in the heart of the city, and the space demands of central stations would be correspondingly reduced.

Through routes represent best transportation theory.

Mr. Richard Petersen, one of ablest transportation experts of Germany—and of the world—presented before the Berlin Institute of Architects in 1911 the diagram shown to the right, as representing the most economical and efficient routing scheme for a trunk system of high speed travel for a great modern city and its suburbs. All routes are through routes.

The scheme could be extended indefinitely by branch lines, and should, of course, be supplemented by lower-speed surface feeders. It would put every part of city and suburbs in communication with every other part by high speed service.

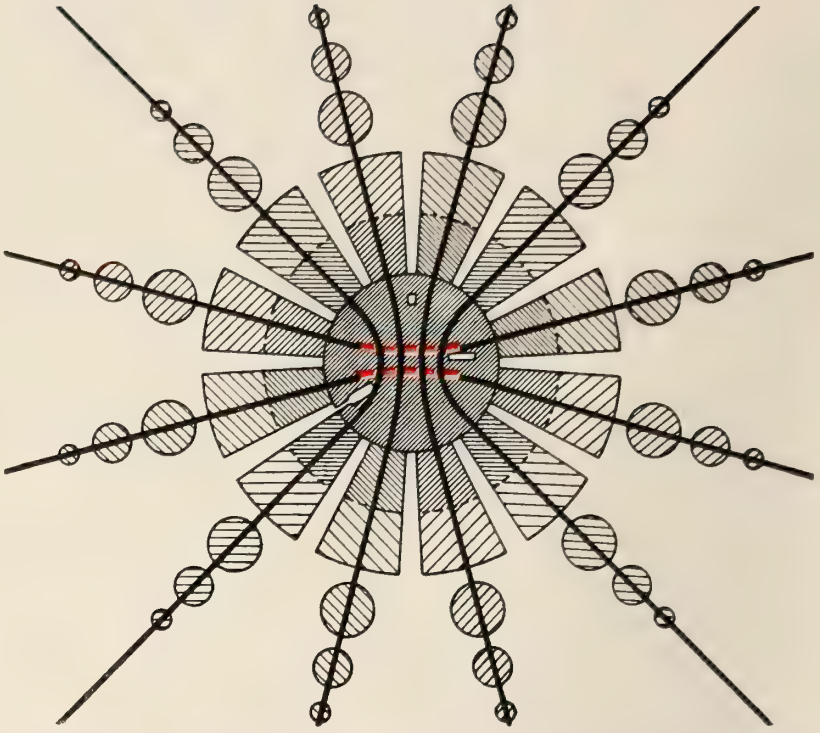


PLATE 79. TYPICAL PLAN FOR HIGH-SPEED PASSENGER ROUTES OF A GREAT CITY. (RICHARD PETERSEN.)

Heavy lines indicate routes; red indicates portions depressed or elevated to secure separation of grades; shaded wedges and white spaces between represent respectively occupied and park areas of the city; outer circles typify suburbs.

Best through-route plan adaptable to Chicago.

The typical through-route scheme above, modified, as shown to the right, to fit a water-front city, corresponds broadly with the possible through routes for Chicago already shown on *page* 72.

In other words, the best in theory may be approximated in Chicago. This is further indicated by the fact that Mr. Arnold's plan—shown in the next chapter—for through routes for Chicago, embodies the principles of the typical through-route scheme, although worked out strictly with reference to the Chicago situation.

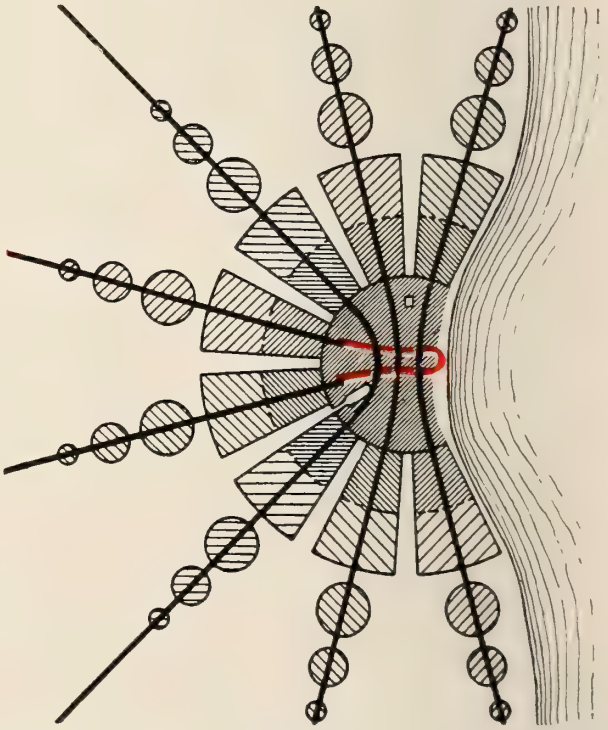


PLATE 80. TYPICAL THROUGH-ROUTE PLAN APPLIED TO WATER-FRONT CITY.

CHAPTER VIII.

THE ARNOLD SCHEME FOR THROUGH ROUTES AND ITS ADVANTAGES.

A TENTATIVE plan for through routes on Chicago's steam lines has been worked out by Mr. Bion J. Arnold, representing the Citizens' Terminal Plan Committee, and was presented to the City Council Committee on Railway Terminals.

This plan, which is shown in the following pages, has not been put forward by Mr. Arnold as a perfected or final scheme. The subject of through routes for the steam lines of Chicago has only just begun to receive serious attention, and the plan is in the nature of a preliminary outline, to be modified and completed as found wise after further and thorough study.

In the recent hearings before the Railway Terminals Committee, on the ordinance for a new Pennsylvania passenger terminal, the railroads declared, on the one hand, that this plan proposed by Mr. Arnold was impracticable, and, on the other, that they did not wish to extend their suburban service. These declarations, however, can in no way be accepted as decisive against the through-route proposal. The Arnold plan will hardly fail to carry conviction as to the practicability and the desirability of some comprehensive through-routing arrangement embodying its substantial features. The actual experience cited in the foregoing pages will also enforce such a conviction.

The question, moreover, as to whether through routes should be established on the steam lines does not concern merely the railroad companies, and should not be determined by their attitude toward an increase of their suburban service. The question primarily concerns the public, and if public convenience demands the installation of such routes, and their installation is reasonable and practicable, they should be established—this to be done, of course, on terms fair to all interests involved.

PLATE 81. MAP OF CHICAGO SHOWING POSSIBLE THROUGH STEAM ROUTES SUGGESTED BY BION J. ARNOLD, 1914.
(SHOWN IN COLORS IN *FRONTISPIECE*.)

KEY

———Existing steam railway. ------Chicago city limits, 1914. ● Existing station.
·····Proposed subway connection. ○ Proposed new station.

The four through routes, including branches, are identified by their respective numerals on the margin of the map.

Arnold through routes would cover greater Chicago.

Mr. Arnold's proposed through-route system (see opposite page; also same map reproduced in colors as frontispiece) for local passenger service on Chicago's steam lines, penetrates the center of the city, and fans out through its entire area to adjacent suburbs. It comprises four great through routes, or (*Nos. 2* and *3*) through-route systems, each distinguished on the map by a number.

Route Number 1 would run north and south nearest the water front. It would comprise the Illinois Central line and the Evanston branch of the Chicago & Northwestern line. These would be connected by a subway continuing the Illinois Central line north under the Chicago river, and then westward. This route would extend southward through Hyde Park, Pullman, Harvey and beyond, and northward through Clybourn Junction, Ravenswood, Rogers Park, etc., to the north shore towns. (See detail, *page* 82.)

Route Number 2 would be established by connecting the Rock Island line with the Park Ridge branch of the Chicago & Northwestern Railroad. This connection would be effected by a La Salle street subway from the Rock Island station north to and under the river, and thence westward. (See detail, *page* 82.)

This route, on the north, would pass through Irving Park, and other northwest points. On the south, it would pass through Englewood to Blue Island, with a Lake Shore branch at Englewood extending through South Chicago and Gary, and a Chicago & Western Indiana branch at Auburn Park, extending through Roseland and Kensington.

Route Number 3 would comprise lines already physically connected at the Union Station, namely, on the north, two Chicago, Milwaukee & St. Paul lines, one passing through Glenview, and the other through Franklin Park; on the south, the Pennsylvania line extending through Hammond, with the Chicago & Alton branching southwest at 20th street and the Wabash branching in the same direction near Englewood. (See detail, *page* 82.)

Route Number 4 would be U-shaped. It would be established by connecting the Burlington line coming in from the west through La Grange, Riverside and Hawthorne, with the Oak Park branch of the Chicago & Northwestern Railroad. The connection would be made by extending the Burlington line north through the Union Station and then westward to the tracks of the Northwestern line. (See detail, *page* 82.)

Presumably the number of stations on many of these lines would be increased, not only in the business district (see detail plan, *page* 82), but elsewhere, especially as traffic should grow. Margins of unbalanced traffic here and there would be cared for by appropriate routing variations.

PLATE 82. MAP OF CHICAGO AND VICINITY SHOWING (IN RED) POSSIBLE NORTH-SOUTH, MID-CHICAGO THROUGH ROUTE, ON EXISTING RIGHTS OF WAY, THREE MILES WEST OF "LOOP" DISTRICT.

Black lines show the system of through routes suggested for Chicago by Arnold. See map on *page* 78 and description *page* 79.

Possible mid-Chicago through route.

In addition to the downtown through routes, shown on *page* 78, it would probably be feasible to establish a great through route (shown in red on opposite page), 30 and more miles long, traversing mid-Chicago from north to south 3 miles west of the "loop" district.

It would be formed by connecting, near Rockwell and Kinzie streets, the tracks (see *page* 70) of the Milwaukee branch of the Chicago, Milwaukee & St. Paul Railroad with the "Panhandle" line of the Pennsylvania Railroad.

This mid-Chicago through route would serve the great western half of the city, now destitute of any means of rapid and continuous north and south travel. It would pass through some of the most important industrial regions of the city, and would connect them with the homes of outer Chicago. It would also cross, at a considerable distance out from the business center, the proposed downtown through routes in such a way as to afford convenient interchange between those routes outside that center.

Through routes would facilitate elastic plan of train operation.

Not all trains on the through routes shown on the opposite page need be operated from end to end of their respective routes. Some would be so operated; others might be operated on the shuttle plan over that portion only of a given route calling for the most service, and still others, particularly extra trains demanded in the rush hours, might run, say, in the morning from one end of a route to and through the central section of the city to convenient coach yards not far beyond, and return in the evening. This last mode of operation would be practicable provided the coach yard capacity of the city, shown on *page* 75, were, irrespective of the question of ownership, made available for interchange use according to operating requirements.

The elimination, by through routing, of reverse movements in handling trains to and from coach yards for storage by day, would also be an important advantage. Under the existing practice trains requiring to be stored after reaching their downtown terminals in the morning, are upon arrival there, taken back as empties to coach yards, distant from ½ mile to 5 miles, along their respective routes. At night they are brought again to those terminals, and by another reverse movement are started out with their loads. With through routes established, and with existing coach yards freely available as suggested, all these reverse train movements in the central part of the city, with their delays, switching and extra space requirements, would be obviated.

PLATE 83. DOWNTOWN DETAIL OF PLAN SUGGESTED BY BION J. ARNOLD FOR THROUGH STEAM ROUTES FOR CHICAGO. 1914.

SHOWING:

In colors—Through steam routes (see *frontispiece* and *page* 78 for complete plan).

In black—East-west subways suggested by Arnold for street or "Elevated" cars, or both, in connection with the through steam routes.

Solid lines indicate existing (steam railway) tracks, *broken lines,* proposed tracks (in subways); *solid circles* indicate existing stations, *open circles,* proposed stations.

Arnold through routes offer every passenger several downtown stations.

The plan on the opposite page presents the downtown detail of Mr. Arnold's tentative scheme—shown in colors in the *frontispiece,* and described on *page* 78—for a system of through routes on the steam lines of Chicago. It is designed to be suggestive rather than final.

The four through routes, numbered 1 to 4 as on the map on *page* 78, are shown, as in the *frontispiece,* in red, green, purple and yellow. They would traverse the central business district north and south, one along its eastern edge, one through its heart and two along its western edge. The plan indicates, in broken red and green lines, the proposed completing links (in tunnels), by which two of those through routes would be formed, together with the existing or proposed downtown stations. At $3,000,000 per mile—possibly a reasonable estimate—these links would cost approximately $12,000,000. With smokeless operation, the adoption of which in the near future is assumed, the tunnels would present no operating difficulty.

The plan shows 8 existing and 7 proposed stations down town. Whether it presents a good distribution and a proper number of these, are questions for further and careful study. The joint station north on routes 1 and 2 (red and green) would be a transfer station between those routes. The three joint stations on routes 3 and 4 (purple and yellow) would be transfer stations between those routes. Whether the routes could be so modified as to secure one transfer station common to all of them, is perhaps a proper question for further consideration. The plan provides for three or more existing or proposed downtown stations for each route.

If every passenger, from whatever direction he might come, could choose thus between several downtown stations, located approximately ½ mile apart, the downtown area conveniently accessible to steam line passengers would be materially increased. In other words, through steam routes would, as before urged, allow the business district to grow.

Steam line through routes should determine plan of other routes.

The plan also shows (dotted black lines) two east-west U-shaped subway routes suggested by Mr. Arnold for street or "Elevated" cars, or both, crossing at low level or touching the steam line through routes at their main downtown stations, and affording interchange between these through routes. The plan thus illustrates too the principle of knitting together different sorts or classes of rail facilities for local travel. A proper correlation of such facilities should obviate duplication of lines, conflicts of levels, awkward connections or other misfits, and so secure the maximum efficiency. In order, however, to insure such correlation it is not only necessary that there be advance planning, but the routes of the steam lines, they being the highest speed facilities, should be determined first of all, and then the lower speed routes, street, "Elevated," or subway, be adjusted thereto.

It is accordingly not safe to locate passenger subways of any sort in the central part of the city—granting that such are to be built there—before it is known where the *main* lines of fast local travel, that is, the steam lines, and their stations are to be located and at what levels. The first step, and the one for which there is real urgency, is therefore to determine the plan for linking up and properly utilizing the steam lines, so that improvements in other facilities may proceed in harmony therewith. Such improvements need not await the completion of steam line through routes, but they should conform to a proper plan of such routes.*

*The question as to whether, in the downtown district, the steam lines should be carried under the streets, as Mr. Arnold proposes, or should, in whole or in part, be carried above the streets—in conformity with the "track elevation" policy applied to the steam roads elsewhere in the city—is not discussed in this book further than is necessary in simply presenting Mr. Arnold's proposals. This whole question of the proper levels for the steam lines, in their relations to each other, to other sorts of railways and to the streets, is omitted as one whose importance and complexity demand more extended consideration than is here practicable. It is believed that this question should be made the subject of a special inquiry.

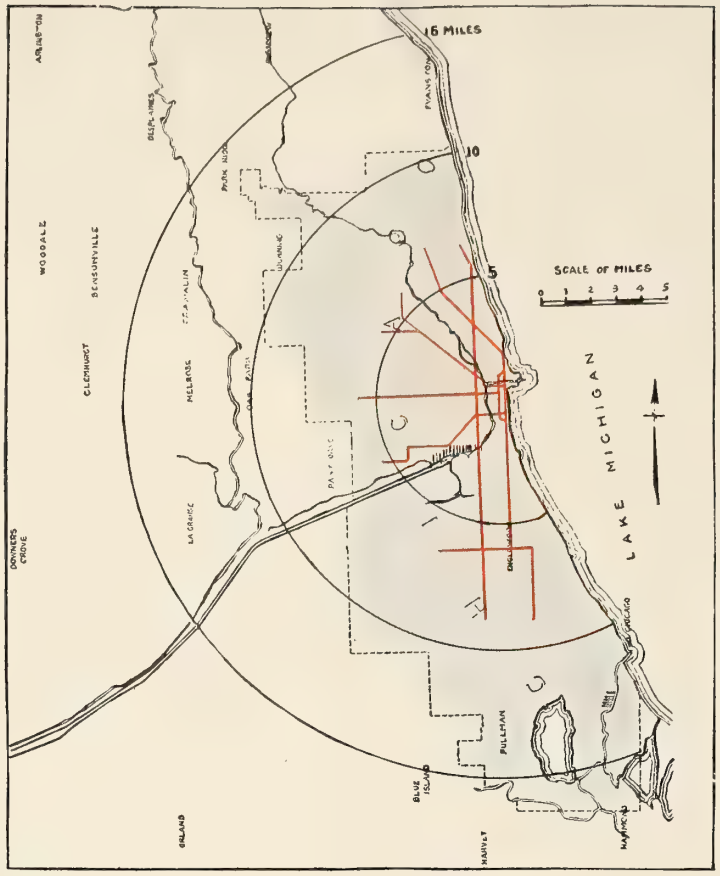


PLATE 84.

SUBWAY SYSTEM
(PROPOSED)

MAP OF GREATER CHICAGO SHOWING (——) PROPOSED "COMPREHENSIVE" PASSENGER SUBWAY SYSTEM. (CITY ORDINANCE OF NOVEMBER 3, 1913.)

GRAY TINT=CITY OF CHICAGO, 1914.

Total Length of Routes—All in City—57.42 Miles.

"ELEVATED" SYSTEM
(EXISTING)

MAP OF GREATER CHICAGO SHOWING (——) EXISTING "ELEVATED" PASSENGER RAILWAY SYSTEM.

GRAY TINT=CITY OF CHICAGO, 1914.

Total Length of Routes in City—59 Miles.
(Four of the routes extend beyond the city limits.)

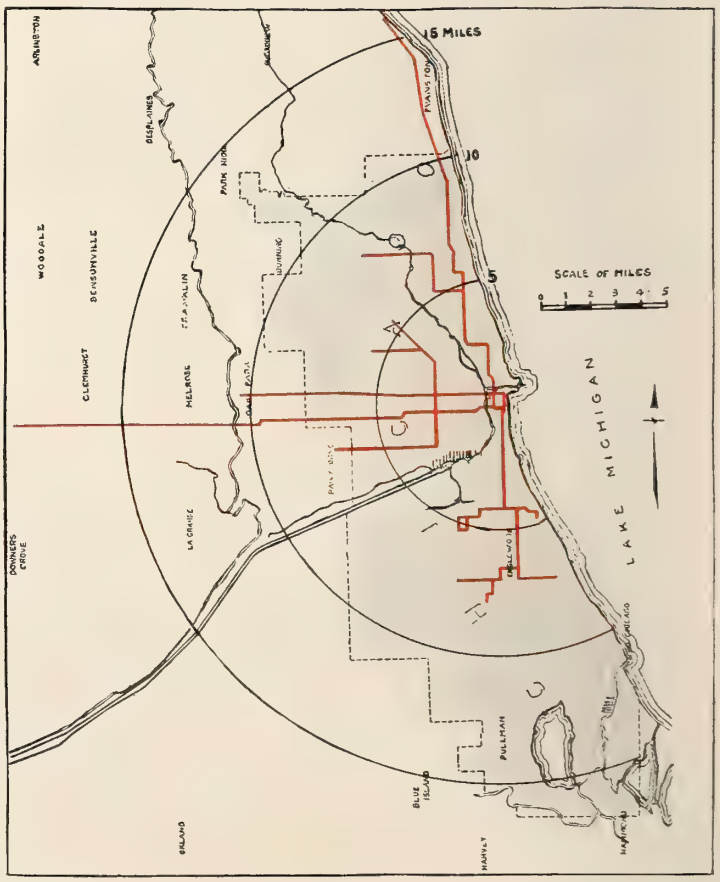


PLATE 85.

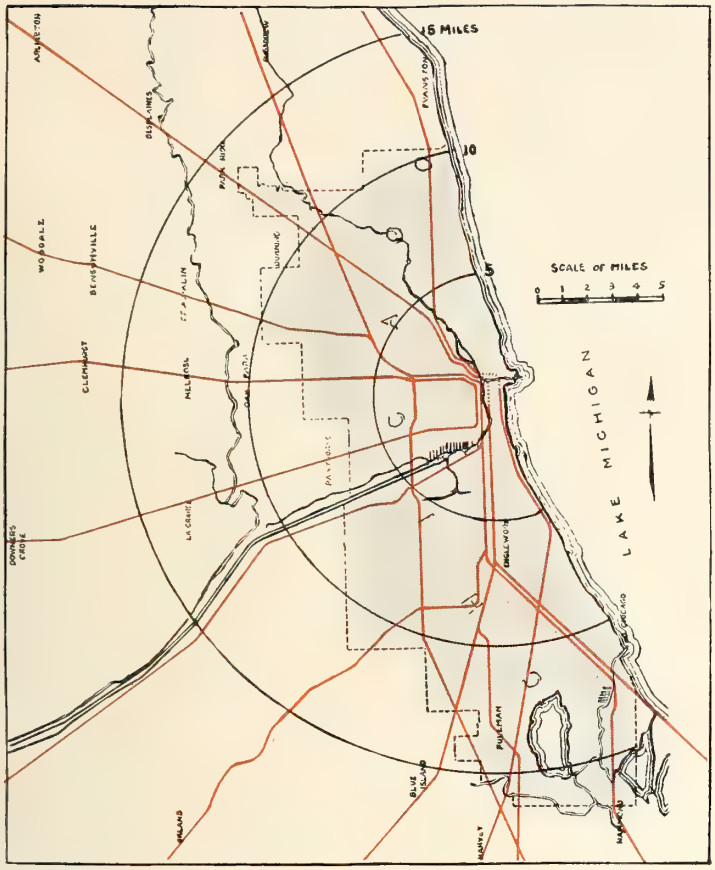


PLATE 86.

STEAM SYSTEM—THROUGH-ROUTE PLAN.

(ALL LINES EXISTING SAVE PROPOSED DOWNTOWN CONNECTIONS)

MAP OF GREATER CHICAGO SHOWING PROPOSED THROUGH-ROUTE SYSTEM FOR LOCAL PASSENGER TRAVEL ON EXISTING (——) STEAM RAILROADS AND PROPOSED (- - - - - -) DOWNTOWN CONNECTIONS IN TUNNELS. MAP COMPRISES MR. ARNOLD'S TENTATIVE THROUGH-ROUTE SCHEME, PAGE 78, AND ALSO THE "MID-CHICAGO" THROUGH ROUTE SUGGESTED ON PAGE 80.

GRAY TINT=CITY OF CHICAGO, 1914.

Total Length of Routes in City—150 Miles.
(All extend beyond the city limits to suburban towns.)

Steam system the most extensive for rapid local travel.

The three possible means of rapid local travel in Chicago are:

1. Subway railroads;
2. "Elevated" railroads;
3. Steam railroads (presumably electrified later).

The subway system, proposed by the Harbor and Subway Commission, and the existing "Elevated" system are shown on the maps opposite; the steam railroad through-route system suggested by Mr. Arnold for the steam lines (with the "mid-Chicago" through route added) is shown on the map above. The three maps are drawn to the same scale and afford a graphic comparison of the three systems in point of extent.

The proposed subway system would be the least extensive of the three. A five-mile radius from the Post Office would include the greater part of its lines. It would fail to reach not only the suburbs, but also great areas within the city itself.

The existing "Elevated" system stretches somewhat farther, but, with the exception of three surface extensions beyond the city limits, that system lies well within a radius of 10 miles from the Post Office. It likewise leaves great areas of the city untouched.

The through-route system proposed for the steam lines far surpasses both the others in extent. Within the city limits it comprises 2½ times as many miles of routes as does the more extensive of the other two, the "Elevated" system; within the entire field of the maps it comprises 3 times as many miles of routes as does that system, and beyond that field it traverses, in a dozen different directions, the great suburban area, into which the "Elevated" system extends in two directions only.

The steam lines, therefore, linked up as proposed, and penetrating thus the heart of the city, would not only ramify more widely over Chicago proper than the lines of either the subway or the "Elevated" system, but they would also, in a comprehensive way, serve suburban Chicago.

Increased accommodation by entire Arnold through-route scheme.

It is in point finally to calculate, under the principles diagrammatically illustrated on *page* 48, the increase in the *number* and *length* of possible rides, within the city limits, by the entire Arnold through-route scheme.*

That scheme would connect up 13 existing steam lines or branches, comprising, within the city, 132 route miles, and, including the increase of 5 in the number down town, a total of 103 stations. The increase thus secured in the number of possible trips without change is shown by the following table:

NUMBER OF DIFFERENT POSSIBLE TRIPS WITHIN CITY WITHOUT CHANGE (ON LINES INCLUDED IN ARNOLD SCHEME) BY TERMINAL ROUTING AND BY PROPOSED THROUGH ROUTING.

Through Route No.	Name of Line.	Trips by Terminal Routing.	Trips by Through Routing.
1.	Illinois Central Chicago & Northwestern (Evanston Line).	423	741
2.	Lake Shore & Michigan Southern Chicago & Western Indiana Chicago, Rock Island & Pacific Chicago & Northwestern (Line through Park Ridge).	199	533
3.	Pittsburg, Ft. Wayne & Chicago Wabash Chicago & Alton Chicago, Milwaukee & St. Paul	102	308
4.	Chicago, Burlington & Quincy Chicago & Northwestern (Oak Park Line).	16	45
	Total	740	1627

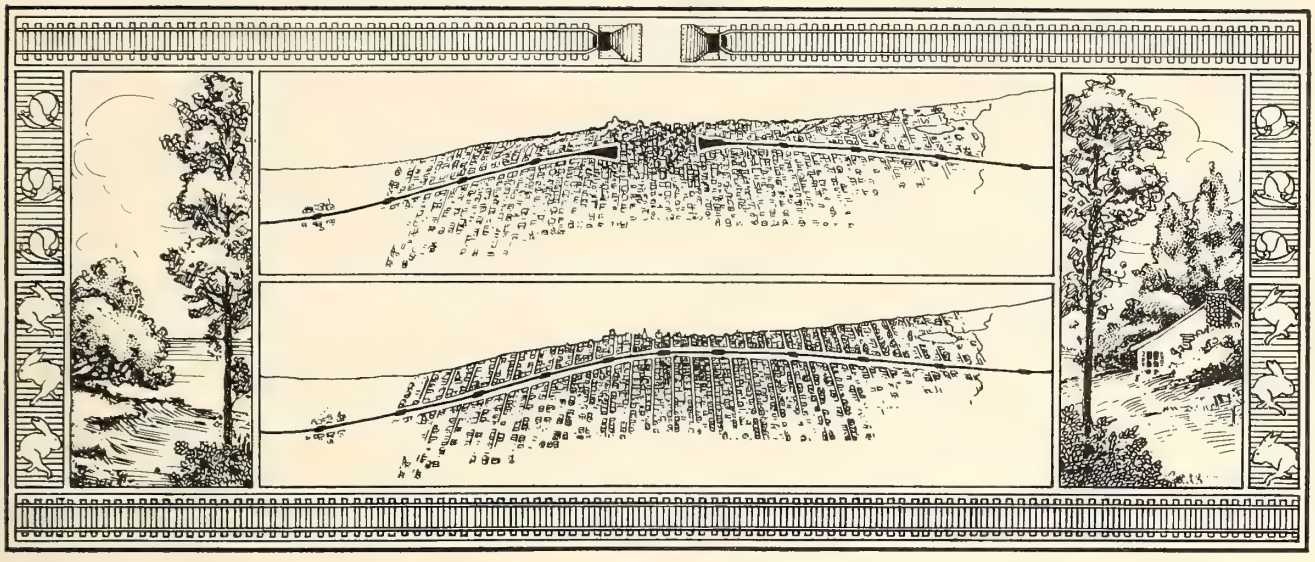
INCREASE IN NUMBER OF DIFFERENT POSSIBLE TRIPS BY THROUGH ROUTING.....887

Thus by through routing, according to the above scheme, the number of different possible trips within the city limits, without change, would be increased from 740 to 1,627, or 887 trips = 120 per cent. Furthermore, if there be counted also the trips possible between certain lines by a single direct transfer (under terminal routing at the Union Station; and under through routing at any of the Canal street stations and at the Ohio street station–see *page* 82) the number of possible trips by terminal routing would be increased from 740 to 892, and those by through routing from 1,627 to 2,213. The total number of possible trips under through routing, 2,213, would thus exceed the total number under terminal routing, 892, by 1,321 trips, or 150 per cent.

The 1,321 new trips would also average 13.8 miles in length, as against 5.7 miles for those by terminal routing, and the average length of *all* possible trips under through routing would thus be increased from 5.7 miles to 10.3 miles = 80.7 per cent.

That this increase of 150 per cent in the *number* of different possible trips, either without change, or by direct transfer, and this increase of 80.7 per cent in the *average length* of different possible trips, would mean an enormous addition to Chicago's facilities for comfortable high-speed local travel, need not be argued.

* The Arnold scheme comprises only routes passing through the downtown district. It does not include the "mid-Chicago" route suggested on *page* 80, which if taken into account would materially add to the increased accommodation shown.



CHAPTER IX.

SUMMARY.

Local passenger service on the steam lines of Chicago has not increased in recent years in due proportion to the increases on other railways. Some of the steam railroads have closed local stations and taken off local trains, saying they did not pay. Railroad managers may also be heard to say that they would gladly discontinue the suburban service which they now maintain.

If the steam railroads find their local passenger service insufficiently remunerative, a reason is not far to seek. The "Elevated" and street car lines give each passenger the option of from 10 to 40 different stops in the business area (bounded by 22nd street, Michigan boulevard, Chicago avenue and Halsted street), while most steam trains stop therein at one arbitrary point only. The street car and "Elevated" lines carry their passengers from one division of the city to another by through cars or direct transfer, while the steam lines offer their passengers neither through cars, convenient inter-station service, nor even connecting trains. It is inevitable, under these circumstances, that the steam lines should lose traffic.

Roughly speaking, there are three kinds of local passenger business which the steam lines should handle, namely:

1. Traffic to and from the small congested kernel of the business district.
2. Traffic to and from the surrounding portions of that district—portions less congested but more extensive, and fast filling up with business.
3. Traffic not destined for any part of that district, but taking place between points in one and points in another of the three great geographical divisions of the city, or their adjacent suburbs.

The steam lines now handle—and with terminal routing can handle—only the first of these three classes of traffic. If they would install through-routing, they could handle the other two classes also.

Through routes on Chicago's steam lines would benefit the railroads themselves, would greatly increase the means and rapidity of local travel, would aid the central as well as the outer portions of the city, and would in many other ways serve the welfare of the people.

Through routes would benefit the railroads.

Through routes would aid the railroads by eliminating reverse train movements in central stations, by lessening thus the number of station tracks required, by reducing in this way the size and cost of stations, by rendering the latter admissible thus at central locations, by interchanging coach yards and so minimizing waste mileage to and from them, and by introducing a new era of development for the local passenger business of the steam lines. They would also aid the railroads by feeding long distance traffic and by smoothing the way for through-routing long distance trains where desired. They would, furthermore, accomplish all these various benefits by employing, in the main, existing facilities, easily capable of much more extensive use and requiring a smaller new investment than any other scheme of equal promise.

If railroad presidents will seek their monuments in the local development of our cities, rather than in pretentious architectural piles—surrounded, perhaps, by ugliness—and if the steam lines will accordingly put their speed at the service of the public on an up-to-date scheme of routing, local passenger traffic on those lines will assume entirely different proportions.

Through routes would speed up travel.

Through routes would vastly increase the means and the convenience of travel. By providing a few comparatively short links, they would bring into more intensive use for local passenger service, and on a new and comprehensive plan, an entire system of existing lines of the highest speed, ramifying throughout Chicago and into the surrounding country. By enabling passengers to ride from one of these lines to another without change, and also to transfer at junction points, they would more than double the number of different possible continuous trips or direct transfer trips, from one station to another station on Chicago's existing steam lines. They would abolish the awkward hiatus in steam travel at the business center, by reason of which it is now impracticable to use the steam lines for cross-town journeys, and would reduce thus by from 20% to 50% the time required for a considerable portion of such journeys.

They would make it possible for a much larger proportion than at present of the entire travel of Chicago to proceed at the steam line speed. They would effect thus an enormous saving of time to the community, while reducing also the excuses for over-crowded and dangerously speeded street cars.

They would secure the maximum convenience for doing business in any part of Chicago, irrespective of one's residence.

Through routes would serve all Chicago.

Through routes would aid the business district. By lessening the width of stations they would economize downtown space and reduce the length of subways under or viaducts over train-sheds and yards. By furnishing more express travel they would tend to lessen the congestion from automobiles in downtown streets, and by bringing passengers nearer their destinations by means of additional central stations they would tend to relieve the congestion of downtown sidewalks.

Through routes would benefit the territory next beyond the business district. They would release that district from the compression of terminal routing, and, through the additional downtown stops, distribute business over a wider central zone.

Through routes would benefit all Chicago, city and suburbs. Being continuous routes, traversing the business area and also stretching far beyond the city limits, they would afford convenient and speedy intercommunication between different parts of the city, between all parts of

the city and all parts of the suburbs, and between the different suburbs themselves. They would serve and tend to build up all of Greater Chicago.

Through routes cheapest and best.

Through routes would mean more home life for the people. They would take passengers to cheap land and encourage thus the provision of better homes and more liberal spaces about them.

Through routes would promote the better health of the people. They would mean, not only travel according to the steam line standards of comfort, but also travel on rights-of-way now mainly elevated above the streets and thus permanently assured of the open air and the sunlight.

Through routes would save money for the people. They would mean, not vast sums for a new plant, but comparatively modest sums for the more intensive use of a great existing plant now operated far below its capacity. They would mean greater benefits per dollar expended than would any other contemplated transportation enterprise. Chicago must have additional facilities for high speed passenger service. The agitation for subways enforces this fact. If these facilities can be secured by extending the use of existing properties instead of building a new system, the people—who must ultimately pay for the latter—will save the cost.

Chicago—city and suburbs—should have the best means of fast local travel—safe, comfortable, sunlit. Through routes on the steam lines can best provide this—and at the least expense.

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